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A.D.A. Annual Meeting, Pittsburgh, October 19–22

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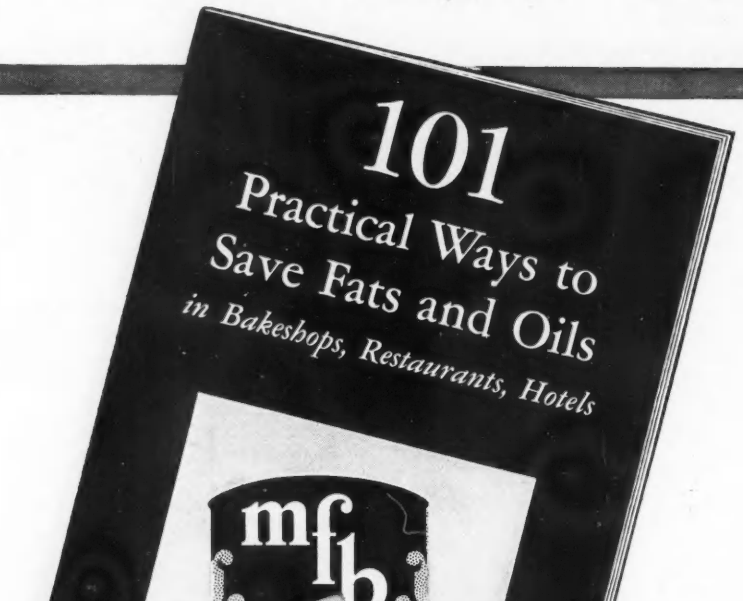
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POSTWAR NUTRITION PROBLEMS[1]

DONOVAN J. McCUNE, M.D., *Attending Pediatrician, The Babies Hospital of the City of New York*

AN ADEQUATE discussion of postwar nutrition problems, the topic which I was incautious enough to accept, would be possible only to one who was at the same time a nutritionist, a dietitian, an economist, a large-scale business executive, a statesman, a social philosopher, and a prophet of large experience. Since I am none of these, but a physician whose daily duties are restricted to children and whose proficiency in other specialties is negligible, you will soon discover that I am better equipped to pose problems than to suggest their solution. It is only fair to warn you of this.

To speak of postwar nutrition problems implies that suddenly upon the conclusion of a final truce or the signing of a definitive treaty of peace there will spring into being a host of difficulties which have not existed before. This is true in part, but also largely false; true, because war does beget new and enormous needs; false, for the reason that a postwar nutritional situation contains a large representation of problems which existed before, and in addition, as wars are fought today, these problems come into being immediately upon the recession of the tide of battle from a given vicinity, long before the war as a whole has come to an end. Hence, what we call postwar problems are with us now. In fact, they have been with us since—thank God—we began to send food to England under the guise of Lend-Lease and to France for the children through the agencies of the Society of Friends and the Red Cross. There is evidently a postwar nutritional problem in Russia and another in North Africa. Here it devolves upon the United Nations not only to maintain their own troops but to feed—adequately, if possible—the peoples who have been unable to provide for themselves because of the ebb and flow of battle across their lands.

Since it is clear that postwar nutritional problems are a composite of the old and the new, it may be well to list what we know of the old and to describe what we can foresee of the new. The problems of feeding people fall into three principal groups, the nutritional, the dietetic and the economic. Nutrition, to me, is the business of finding out what people should eat in order to be healthy, efficient and happy, and to live as long as possible. Nutrition is a science, dignified with animal and test-tube experimentation, hypotheses, articles in scientific journals and all the other ornaments which make a science respectable. Dietetics—to preserve a classical distinction—is an art which has to do with finding out both what people want to eat and what the nutritionist says they should eat, and with solving the problem of serving it in a manner which will make it palatable to the one and gain the approval of the other. Economics has many aims. The one in which we are interested is that of making it possible in some way or other for people to get by purchase or by gift what the nutritionist prescribes and what the dietitian can serve.

THE RESPONSIBILITY OF THE NUTRITIONIST AND THE DIETITIAN IN POSTWAR FEEDING

We shall not try to decide whose is the hardest task. In the case of the nutritionist it is a comparatively easy thing to investigate an unexplored field, the boundaries of which have been surveyed by another, to design simple experiments to prove single points and to investigate the relation between diet and certain types of disease. But if you ask the nutritionist to include in his researches what we call positive health, with its connotation of happiness, efficiency and long life, you will make his problem exceedingly difficult. If he takes you at your word he may even refuse to attack the problem, as being insoluble at the present time. To the dietitian falls the task of understanding scientific nutrition and respecting it without taking too seriously its temporary conclusions—certainly not to the point of revising her whole point of view every time a new paper appears which pretends to have proved something diametrically opposed to what has long been taken to be a fact. The dietitian is, or should be, the humane realist who knows what people want and what they should want; who explains the people to the nutritionist and the nutritionist to the people. The nutritionist is the laboratory worker; the dietitian meets, manages and satisfies the consumer.

Just as the nutritionist is able to assimilate other workers' scientific ideas in several tongues, conceive erudite speculations, plan animal experiments, handle the biochemical details of these experiments, analyze his data in acceptable statistical manner and present his conclusions in a form which his fellow investigators will understand, so the dietitian should be able to grasp individual and national tastes by instinct and observation, if not by ear, irrespective of the language in which they are offered; to think up ways to satisfy them; to work out diets on a trial basis; to describe the culinary details with great exactness and, finally, to tell those who wish to know how the prescription works in practice. These are heavy requirements but they do not demand too much of a group whose role in feeding people is so important.

Concerning those who participate in the economic phase of the problem I have little to say. Their number is vast and their functions diverse and complex. Included are the farmer who grows food, the shipping agencies which transport it, the seller who distributes and the government agencies which exercise varying control over production, distribution and purchase. Perhaps the most important single unit in the great structure is the policy-making branch of the government upon which falls the responsibility of making far-seeing decisions well in advance of need and of finding managerial talent competent to execute them.

CONTEMPORARY PROBLEMS OF THE NUTRITIONIST AND DIETITIAN

What are the present problems which confront these groups? To tabulate them collectively would be meaningless. To list them entirely is almost impossible. To review a few in order of approximate importance to each type of specialist one might proceed as follows: Because of the manner in which it developed, the first concern of the embryonal science of nutrition was with disease. This was logical since beriberi and scurvy were recognized to be due to nutritional privation and could be both prevented and cured by more liberal amounts of certain types of food. On this basis sys-

[1]Presented before the Greater New York Dietetic Association, January 25, 1943.

tematic inquiry was begun. The nutritionist entered the fields of physiology and biochemistry. Without losing his interest in disease he became concerned with the effect of diet on the normal operations of the animal body. Finally, his thoughts have turned to the relation between alimentation and emotion. To summarize the triumphs which have been won in this long struggle would be to repeat what most, if not all of you, already know. The fact that frank examples of nutritional polyneuritis, scurvy, rickets, night blindness and pellagra are either rare or highly uncommon in communities such as New York is not due to the unsupervised growth of national nutritional plenty to a point where a person can hardly avoid eating enough of the right kind of foods to avoid disease. The great fertility of our land *has* played a role, but in certain parts of the country just as fertile as others, where, however, nutritional advice is unknown or ignored, these preventable disorders flourish in great number.

As it became evident that the conquest of nutritional disease in its outspoken, conspicuous forms was possible, attention came to be focused upon the earlier, hidden but potentially serious aspects of privational illness, the so-called subclinical forms of disease. The early identification of incipient privation may safely be termed the most important of the old or prewar problems of nutrition. The difference between what we call the earliest stages of disease and what we designate as perfect health is clearly very small, so small in fact that the mathematician would call it infinitesimal. This is the reason which compels the interest of the nutritionist and the physician in subclinical deficiencies: They provide one way of approaching the appraisal of the nutritional optimum or positive health.

It should be made clear to you that the task has proved to be exceedingly difficult. The difficulties fall into three classes: chemical, physiological and third, the matter of interpretation. Methods have had to be devised which make possible the measurement of protein, sugar, fat, a large family of minerals, vitamins and enzymes in the comparatively meager samples of foods of animal and plant origin which are available to the biological chemist. In this we have been gratifyingly but incompletely successful. For example, the estimation of vitamin D cannot be carried out reliably, except in restricted situations, by chemical means. Material must be fed to suitable animals, a large number of which are required for each determination. Estimation of the members of the vitamin B complex is a formidable chemical task. Quite recently, the knowledge that certain bacteria have specific requirements for various members of the B complex has resulted in the development of the microbiological method of assay which consists of observing the growth of such bacteria and from the rate of growth deducing the presence and the amount of the particular vitamin which it is desired to measure. Given a means of quantitative analysis for a given nutrient, it then becomes necessary to interpret the significance of its presence in a given location and of drawing conclusions from knowledge of its concentration. You are all familiar with the fact that the biochemical examination of plant foods or meat usually includes the whole specimen, or at least all that is intended for consumption. In this way direct information is obtained concerning the cellular content of the desired substance.

Similar information is often required in the nutritional appraisal of man. It is, however, seldom available because of the natural dislike which we all share for having little pieces cut from our persons to satisfy someone's curiosity, no matter how altruistic and well intended that interest may be. This being so, biochemical inquiry into nutrition in man is—with the exception of the occasional biopsy—limited to examinations of blood and excreta; these provide only indirect light on what is going on within the cells, the place where nutriments function.

These remarks are offered in explanation of the controversies which exist concerning the meaning of biochemical data. For example, for a considerable time we have held that a low concentration of ascorbic acid in the blood plasma, for example, less than one-quarter of a milligram per 100 cc., suggested the imminence of scurvy. This has now been disproved; the tissues cling tenaciously to vitamin C for some time after it has disappeared from the plasma. A new type of sample is now used, namely, one taken from the mixture of blood platelets and white cells which forms between the red cells and serum when blood is centrifuged. This has proved a more reliable mirror of the state of the cells as a whole.

One way around the difficulty of measuring essential nutriments is to determine quantitatively the increase, during privation, of substances which normally occur in the body as traces or at low concentration during periods of nutritional health. Lack of thiamin causes an accumulation in the blood of pyruvic acid, a chemical link in the chain of energy transfer when carbohydrate is burned. Holt and Najjar have demonstrated certain anomalous porphyrins in the urine of pellagrins.

All of the biochemical effort which has been put into the study of problems of nutrition has not been expended solely to disclose the mechanism of disease, but equally to gain some knowledge of function. Although direct observation of the behavior of the intact animal in response to nutritional privation remains, as it has long been, the keystone of nutrition research, this technique is difficult to apply to man. Self-experiment, in which an investigator voluntarily submits himself to restriction of diet, and the involuntary experiments provided by war have supplied information concerning human requirements. But it is only in the recent past that the components of nutrition have been sufficiently segregated to permit, on a large scale, profitable observations on human subjects.

The discoveries of Wilder and others concerning the early effects of thiamin privation in the human being illustrate the value of this method of attack. I shall not dwell on the difficulties of interpretation which are encountered when all of the data are in. The crux of the matter is that, whereas it is easy to judge the significance of gross changes, such as those which occur when the rachitic infant is given cod liver oil, it becomes harder and harder to appraise lesser effects, as for example, when an apparently healthy but somewhat out-of-sorts individual is supplied with a few capsules of thiamin. It is hoped that these brief remarks will have explained why it is generally agreed that the detection of early privation—hidden hunger, as it is graphically called—is the most important of the problems which now confront the nutritionist and will continue to confront him increasingly when the war is over.

What are the contemporary problems of the dietitian from the point of view of a physician? Having already

stated and amplified the view that the dietitian is the liaison officer between the nutritionist and the people, I shall confine myself at this point to expressing the conviction that her greatest single problem is that of developing the ability and the techniques required to teach her clientèle the principles and practice of individual and family nutrition in such a manner that they can understand the whys and the hows of proper eating. The problem is complicated by the advent of rationing, which imposes upon her ingenuity the need to show people how to budget food as well as, if not better than they do their money.

I have dwelt thus long on contemporary problems for the reason that I see no clear-cut or fundamental difference between problems of postwar nutrition as they affect the nutritionist and the dietitian and those which prevail now. The difference, chiefly, is one of degree. Things with which we are familiar in one size look strange when magnified. The greatest problems of postwar nutrition confront those responsible for the economic aspects of feeding people. Theirs will be a herculean problem, one which I am not competent to discuss except by implication.

NUTRITION PROBLEMS FOLLOWING WAR-BORNE STARVATION

The nutritional diseases which we may expect to see in increasing number and full severity in the wake of war-borne starvation are, to mention only the most important: hunger edema, due to lack of protein in the dietary; scurvy; rickets in growing children; and osteomalacia among the adults, particularly in pregnant and nursing women. These will occur because of deficiency of milk and of fish liver oils. Both rickets and osteomalacia will sometimes be followed by tetany when the stores of calcium within the skeleton are so low that no more can be withdrawn by the overworked parathyroid glands. Lack of fats, leafy green and yellow-colored vegetables and of fish liver oils will also beget a host of symptoms of vitamin A deficiency of which the most distressing will be drying of the membrane which protects the eye and finally liquefaction of the eyeball itself. Paralysis of the extremities and heart trouble, that is to say, polyneuritis and beriberi due to athiaminosis will be common, as well as pellagra and other syndromes due to lack of the vitamin B complex.

This picture is a composite of the written and verbal descriptions of what was seen in Russia, Central Europe, Germany, Austria and elsewhere after the last war. It depicts what takes place when the human diet is reduced to the barest minimum. We pray, and we hope with some confidence, that it will not happen here. No matter where it happens the problems which it denotes are no longer primarily nutritional. Nutrition has contributed nearly all that may be expected of it with relation to these diseases: All can be prevented and cured by well-known means. The difficulties which must be met and overcome are those of production, transportation and distribution, all complicated by dearth of manpower, shortage of materials and political imbroglios in a manner to tax the courage of the most confident.

What we are most apt to see in this country is restricted starvation in the midst of, if not plenty, at least enough. A large part of this starvation will be the fruit of ignorance, antipathy or intransigeance. It will affect individuals and families who have not been taught to spend their new wealth properly, those who have been properly instructed but are not interested, and those whose addiction to a dietary fad or whose unwillingness to modify their own tastes causes them to refuse the foods which are known to be protective. This starvation does not tear at the heart-strings so violently as the former: it is less extreme. But its importance to our national vigor during the period of extraordinary stress which must inescapably follow the conflict cannot be exaggerated. We must be prepared to witness some increase in those states of privation just mentioned, reflected chiefly in large numbers of individuals who are tired, cannot sleep, do mental work with difficulty and are rapidly exhausted by physical effort. Not all of us are prepared to go the whole way with even the most reputable commercial advertising or the most reliable researchers in ascribing the full responsibility for such states to faulty nutrition. Other causes must be at work. Emotion is not solely a matter of chemical action. On the other hand there can be no reasonable doubt that some of these instances may be due wholly or in part to lack of proper food.

I think that I have already emphasized sufficiently, if not overmuch, the role of the dietitian in these matters. May I add, in closing, a list of the qualifications which she must bring to her job to do it well: Eagerness not simply to learn by rote, but to assimilate and to understand; kindliness toward clients, many of whom will speak strange, incomprehensible tongues, and will be ignorant if not stupid and firmly wedded to habits of eating very foreign to all of us, and many of whom will be sick; ingenuity to make the best of materials and equipment which will often leave everything to be desired; and last, although it may sound frivolous, an epicurean taste which will promptly distinguish between that which is merely nutritious and that which is both nutritious and a really good meal. With these assets well developed the dietitian will do credit to herself and to her profession and win the gratitude of those whom she serves, be it on the home front or in foreign lands, now and after the war.

Specific Dynamic Action

The specific dynamic action of amino acids and proteins was first generally recognized as an apparently clear concept according to which an amino acid produced a definite heat increment in metabolism, varying from large to negligible among different amino acids. In time, this concept became obscure and obviously empirical. Eventually, the more fundamental features of the dynamic action have been uncovered. The metabolism of the carbon moiety of the amino acids is probably the major source of increased energy production following ingestion of amino acids or proteins. In fact, the closest correlation found between any two measurable factors is that between the dynamic effects and the total metabolizable energy of the amino acids. These findings "do not lend support to the idea that certain amino acids or certain of their cleavage products act in the body as special metabolic stimulants in the pharmacodynamic sense."—*Heidelberger, M.: Relation of Proteins to Immunity, in Addendum to The Chemistry of the Amino Acids and Proteins. Baltimore: Charles C. Thomas, 1943.*

DIET IN RELATION TO HEPATIC PHYSIOLOGY AND PATHOLOGY: A REVIEW OF PERTINENT DATA[1]

FRANK C. MANN, M.D., *Division of Experimental Medicine, Mayo Foundation, Rochester, Minnesota*

I PRESUME that most dietitians have a greater interest in diets as preventive and therapeutic measures than in the possible physiologic mechanisms on which the rationale of such use depends. Accordingly I shall devote more of my time to a discussion of diets in relation to pathologic conditions of the liver than to the physiologic activities of the organ in respect to diet. However, I should like to note that in general, knowledge concerning the normal physiologic activities of the liver appears to be more abundant than knowledge of the alterations of hepatic functions associated with pathologic conditions of the organ. Furthermore, knowledge of the physiologic activities of the liver is necessary in order to understand why diet is considered an important factor in protecting the liver from injury, in the mechanism of development of some of the lesions of the organ and in avoidance of unnecessary functional stress on the impaired liver. In presenting my subject, which is a very broad one, I shall draw freely on previous publications by my colleagues, myself and others. However, since the material presented consists mainly of a summarization and interpretation of the results of the many investigations which have been done over the past several years, it is unfeasible to cite more than a few of the more pertinent references.

Physiologists, clinicians, nutritionists and dietitians probably too often consider diets as things apart from the machine for which they exist. One places so many calories' worth of this and that together and expects to obtain the full caloric value without giving due consideration to the many exceedingly delicate physiologic mechanisms which must function correctly if such a happy outcome is to occur. The liver has a part, either direct or indirect, in most of those mechanisms which make possible the beneficial results obtained by ingestion of food and fluid specific in amount and character, which is the physiologic concept of diet.

DIET IN RELATION TO HEPATIC FUNCTION

The first physiologic process encountered by ingested food is digestion. The liver can be considered as one of the organs of digestion, not only because it secretes bile, which contains the bile salts essential for the maintenance of normal digestion, but also because most of the products of digestion must pass through the liver before reaching other tissues of the body. In the latter capacity the organ can be considered as a filter of the blood that has passed through the organs which function in the digestion and absorption of a large percentage of the food substances that enter the body.

Facts pertinent to our subject concerning bile are the following: Bile is secreted by the liver more or less continuously but alterations of quantity and quality occur after the ingestion of food. The magnitude of these changes depends to some extent on the amount and character of the diet; for instance, a diet consisting predominantly of protein or fat produces a larger volume of biliary secretion than a diet composed mainly of carbohydrate. While bile contains several important constituents, the bile salts appear to be the most significant in relation to the processes of digestion and absorption. These substances are essential for the absorption of fat and if they are absent from the intestinal tract, not only is there a failure of this important food substance to reach the tissues of the body but the fat-soluble vitamins are also unabsorbed.

Only one fact needs to be emphasized in regard to the filter function of the liver. The blood in the portal vein, which carries the products of digestion to the liver, is not mixed, so that the blood drained from certain portions of the gastro-intestinal tract goes to definite regions of the organ. For instance, the blood from the upper portion of the intestine goes mainly to the left lobes of the liver while that from the lower portion of the intestine passes for the most part through the right lobes. Therefore food substances that are easily absorbed and pass into the portal blood through the upper part of the intestine may transverse only a portion of the liver. In order for the whole liver to serve as a filter, it is necessary for the ingested food to be of such amount and character as will cause the entire intestinal tract to be involved in the process of digestion.

While diet has many relations to hepatic function it is most important in regard to those hepatic activities that have a part in the metabolism of the body. The liver has many roles in this regard but three can be mentioned, the storage, manufacture and regulation of food materials.

The higher organisms obtain their food at intervals, but their tissues are constantly using food for growth, for repair and for energy to maintain body temperature and mechanical activity. It is obvious that some provision must be made to supply the tissues with food during the inter-digestional periods. The most important physiologic mechanisms for furnishing a constant supply of the required amount of usable food reside in the liver.

The three major foodstuffs, carbohydrate, protein and fat, are stored in various tissues throughout the body. Not only is the capacity of the liver for storage of these food materials in general relatively larger than that of other tissues, but the hepatic stores are capable of being more quickly mobilized for utilization.

Carbohydrate is stored in the liver in the form of glycogen, which can be quickly transformed into glucose. The latter appears to be the most readily available and most easily utilized of all foods. The amount of glycogen stored varies within wide limits, but hepatic tissue rarely appears to be glycogen-free. The amount of glycogen which can be stored is very large and may, under forced conditions of rapid intake of carbohydrate, reach 20 per cent or more of the total hepatic substance.

It has not been proved that there is a special form of storage protein similar to that of carbohydrate, glycogen, but there is no question that a certain protein content of the liver is labile and can be used by other tissues of the body. This labile hepatic protein differs from that in the other tissues in this respect, it can be mobilized more quickly and a higher percentage of the total amount available can be utilized. While it appears that the body as a whole contains

[1]Read before the American Dietetic Association, Detroit, October 20, 1942. Received for publication, April 12, 1943.

a considerable amount of protein which can be used as fuel, that in the liver appears to be more readily available than the protein in other tissues. In the fasting state the protein content of all tissues decreases; however, not only is the percentage decrease of hepatic protein greater than that of any other tissue protein, but it also occurs more rapidly.

The fat content of the liver may vary within wide limits, the amount present at any given time depending on many conditions, both physiologic and pathologic. When there is an adequate intake of carbohydrate and protein, the amount of fat in the liver is almost constant; it may reach 50 per cent of the total hepatic tissue in certain conditions and is increased physiologically when the diet is composed almost exclusively of fat as well as during the fasting state in the presence of an available supply of fat in other fat depots of the body. Hepatic fat will be discussed later in connection with fatty liver.

Not all food substances, as absorbed from the intestine, can be utilized directly by the tissue cells nor so readily as when converted to another form. The liver maintains its function of providing the body tissues with a constant supply of food by converting some of the substances absorbed in a non-usable form into one that can be burned by the tissues.

While the forms in which carbohydrate is absorbed are relatively simple, they cannot all be utilized directly by the tissues. Glucose appears to be the sugar of choice for utilization in the body. In all probability the carbohydrate that reaches the blood stream in forms other than glucose is converted by the liver into glucose or glycogen.

Protein is absorbed from the intestine in the form of amino acids, some of which are used to form new proteins for growth or repair of tissues, for maintenance of the plasma proteins and for storage. Since the body under normal conditions with an adequate intake requires for these purposes only a part of the protein ingested, that remaining, which is often a considerable share of the total intake of protein, is burned for fuel. In order for protein to be utilized for fuel it is necessary that the amino acids be deaminized. Part of the nitrogenous portion is used for synthesis of amino acids and protein, part is converted into urea for excretion as a waste product while the remaining portion is burned, mainly as carbohydrate. The liver appears to be the only site for the formation of urea and is certainly the major site where deamination occurs. Also the liver appears to be the site where a considerable portion of the plasma proteins are made.

Knowledge of the processes of fat metabolism is very inadequate. The scanty evidence would indicate that the liver may be important in preparing fat for utilization by the tissues, as is indicated by the fact that in conditions of dearth of other foodstuffs, the fat content of the liver is increased.

Not only is it essential that the body cells have a constant supply of food, but the amount which reaches them must be regulated to meet their varying needs. In all probability hepatic activity is responsible for regulation of the more important supplies of food to the tissues, although the regulatory function of the liver has been demonstrated more clearly in the control of the concentration of glucose in the blood than in the control of the concentration of other foodstuffs. The concentration of glucose in the blood is one of the important physiologic constants. If the organism is to function normally, it is essential that this concentration be maintained constantly within rather narrow limits which differ for different species of animals, but are very definite in almost every species. When the concentration of glucose exceeds a certain limit, glycosuria occurs; if the amount of glucose is less than the normal limit, symptoms of hypoglycemia occur. It is a vital function of the liver to maintain the concentration of glucose in the blood within definite limits. Not only is hepatic activity responsible for maintaining the normal values for the blood sugar, but states of hyperglycemia are also dependent on the liver. The increases of blood sugar which occur after loss of the pancreas, injection of epinephrine, etherization, development of asphyxia, and so forth, do not occur in the absence of the liver. There is some evidence that hepatic activity is important in controlling the supply of protein and fat to the tissues. The variable concentration of these two food substances in the liver is significant in this respect. Recent evidence suggests that the regulation of protein may be brought about by the plasma proteins formed in the liver (1).

DIET IN RELATION TO PATHOLOGIC CONDITIONS OF THE LIVER

Numerous factors affect the mode and rate of development of any type of pathologic lesion. The condition of a lesion at any particular time of its development is usually the result of an interacting procession of events. The characteristic manifestations of a lesion are determined, for the most part, by the exciting agent and the reaction of the cellular elements to it, but other important factors enter into the development of pathologic processes. Among these are the physiologic function of the organ in which the lesion exists, the state of activity of the organ at the time the exciting agent first makes its appearance, and the portal of entry of the exciting agent. These and many other factors, depending on the physiologic status of the organ as well as on the exciting agent and cytologic changes, can be considered as significant in the development and final state of any given lesion.

Probably this concept of the dependence of the development and persistence of pathologic lesions on physiologic activity cannot be better illustrated than by the relation of diet to the initiation and development of certain lesions of the liver and by the support of the condition of hepatic insufficiency by the character of food ingested.

A vast amount of research has been done on the problem of protection of the liver by alterations of diet and the treatment of hepatic insufficiency by diet, the results of which are not in entire accord. However, there is sufficient agreement to permit a few general conclusions. A brief review of pertinent data would appear advisable before such conclusions are drawn.

One of the first observations which appeared to indicate that diet might bear a relation to the development of pathologic lesions in the liver was made in studies of the effect of the hepatotoxin, chloroform, on puppies. Chloroform produces central necrosis of the lobules of the liver. It was observed that puppies were more resistant than adult dogs to the production of such lesions by the administration of chloroform (2). One of the outstanding differences in the livers of

young and adult animals was the content of glycogen, it being much higher in the livers of the young than of the adult animals (3). It was also found that a high-carbohydrate diet not only increased the glycogen content of the liver of the adult animal but also made such livers more resistant to the action of chloroform (4).

Many years ago my associates and I attempted to produce chronic hepatic insufficiency in animals by various means, for the purpose of making an experimental study in regard to the value of certain liver function tests. The hepatic lesion which can be produced experimentally and which simulates most clearly the lesion seen clinically is cirrhosis. Typical hepatic cirrhosis had been produced experimentally by the administration of the hepatotoxin, carbon tetrachloride (5). This appeared to be the method of choice. In order to produce the chronic lesion it is essential to produce repeated acute lesions by repeated administration of the hepatotoxin. We found considerable variability in the effect of the substance on different individual animals and not a few succumbed to amounts of carbon tetrachloride apparently necessary to cause the acute lesion and, in turn, the chronic lesion, cirrhosis. Acting on the observations that had been made in regard to chloroform and supported by a recently discovered fact that the maintenance of the glucose content of the blood is a vital function of the liver (6), we placed some of our animals, previous to the administration of carbon tetrachloride, on a diet consisting of a simple protein (skim milk) and of high-carbohydrate (syrup and bread) content. Animals so maintained proved much more resistant to the effect of carbon tetrachloride than those not on a high-carbohydrate diet. In all of our experimental work, carbohydrate has proved to be of value in protecting the liver from injury by the hepatotoxins we have used. An abstract of results of investigations (7, 8) illustrating this statement follows:

Four dogs were maintained on a diet of skim milk, bread and syrup; 4 on a mixed diet containing about 25 per cent meat protein, 50 per cent carbohydrate, and 25 per cent fat; 4 other dogs received as much meat as they desired. All received daily doses of 10 cc. carbon tetrachloride by mouth. Within 3 months, ascites developed in all the animals fed an exclusive meat diet and 2 had died. In the same period, the other 8 dogs remained in good condition and showed no evidences of ascites. Biopsy revealed that the livers of the animals that had been fed meat had more extensive injury than was present in the other animals, although all had definitely cirrhotic-appearing lesions.

Similar results have been obtained by Bollman (9) in our laboratory, using male white rats weighing approximately 200 gm. each. They were each fed a basic diet which consisted of 44 parts lean meat, 44 parts cracker meal, 8 parts lard and 4 parts salt mixture and vitamin supplement. The rats were kept in individual cages and the uneaten portion of the food was reweighed each day. The mixed diet was fed in 20 gm. amounts; the carbohydrate diet consisted of 10 gm. mixed diet and 7 gm. cracker meal; the protein diet, 10 gm. mixed diet and 10 gm. lean meat; the fat diet, 10 gm. mixed diet and 3 gm. lard. The amounts thus fed were isocaloric. All animals were given the experimental diet for 5 to 7 days prior to exposure to carbon tetrachloride.

The animals were placed in a closed chamber and exposed to carbon tetrachloride vapor for 30 minutes three times each week as long as they survived. The concentration of carbon tetrachloride vapor was uniformly maintained by vaporizing 1 cc. carbon tetrachloride in 10 liters of air passed through the chamber each minute. This experimental procedure ensured the production of extensive hepatic injury in all animals. A marked decrease of the glycogen content of the liver and hepatic necrosis were observed in all the rats. The hepatic necrosis appeared greatest with the fat diet and least with the carbohydrate diet, while regenerative changes were most marked in the protein-fed animals.

In a second investigation, using the same diets as before and administering the carbon tetrachloride in the same manner, Bollman studied not only the hepatic injury produced but also noted the length of life of each animal. Considering the duration of life of the rats on the mixed diet as representing a protective value of the diet of 100, the following protective values were obtained: carbohydrate 146, protein 100, fat 91.

In a third investigation, three-fourths of the mixed diet was replaced with isocaloric values of carbohydrate, protein and fat. With the protective value of the same mixed diet as 100, the following protective values were obtained: carbohydrate 205, protein 104, and fat 58. All of the diets used were adequate to maintain normal animals.

The high-carbohydrate diet has been of value not only in regard to the acute effects of the hepatotoxin, but also in supporting the functions of the seriously impaired liver. During the past 20 years we have studied in our laboratory a large number of dogs in which various degrees of hepatic injury had been produced. The hepatic tissue in some of these animals had been reduced to an estimated 15 per cent of the normal amount. Other animals had very marked cirrhosis of the organ. Some, with severely injured livers, had been studied for a period of several years and were maintained in good condition on the foregoing high-carbohydrate, moderate-protein and low-fat diet. Placing such animals on a meat or high-fat diet was usually followed by death in a short time. We have maintained dogs that had complete biliary obstruction on a diet of milk, bread, and syrup for 6 to 12 months and have repeatedly observed the rapidly fatal effects of diets composed entirely of meat or high in fat content. After biliary obstruction for 3 months, no dog has survived on a diet entirely of meat for more than a few days.

Not only has diet been of value in protecting the liver from injurious agents and aiding in the maintenance of functions of the impaired organ but it has also been helpful in some of the conditions associated with hepatic insufficiency. Ascites is a good example (8).

Ascites develops spontaneously in animals that have very extensive cirrhosis, and also after obstructive jaundice of long duration. Under both of these conditions we have been able to produce and remove ascitic fluid by dietary measures. Animals that had obstructive jaundice were maintained for 3 or 4 months on a diet of milk, bread and syrup and did not show any evidence of ascites. They were then fed meat for 3 or 4 days. In most animals, within 24 hours after the feeding of meat had been instituted, the

presence of ascites could be determined by inspection of the abdomen. It was fairly common for the abdominal circumference of an animal weighing 5 to 7 kg. to increase from an original measurement of about 35 cm. to more than 50 cm., and from 1 to 3 liters of fluid could be aspirated from the peritoneal cavity. In many animals this process was repeated several times. Certain animals appeared more resistant than others, but in all cases ascites developed within 4 days of the initiation of repeated feeding of meat. Most of the animals that were refractory to formation of ascitic fluid became less so as the interval after complete biliary obstruction increased, and with repetition of the regimen of meat feeding. As the process was repeated again and again, ascitic fluid could be formed with smaller and smaller intake of meat. Experimental cirrhosis must be very extensive before ascites can be produced in this way, but if the cirrhosis is extensive enough, feeding of meat will produce ascites.

The active substance which produces ascites in these animals probably is not protein. Proteins of milk do not favor the production of ascites. The active principle appears to be in the water-soluble extractives of meat. The feeding of meat extract free from protein and fat produces results which are even more striking than those produced by the feeding of meat. Within 4 to 6 hours after 25 gm. meat extract has been fed to animals that have obstructive jaundice of long duration or extensive cirrhosis, marked abdominal distention is evident and 2 or 3 liters of newly-formed ascitic fluid can be withdrawn. Control experiments with the addition of salt to the diet have produced entirely negative results.

The ascites disappeared in most instances when the meat or the meat extract was withdrawn from the diet. The substitution of large amounts of carbohydrate seemed to aid in the removal of the fluid, causing it to disappear more rapidly than when all food was withheld. With repetition of the formation and removal of ascitic fluid, the animals became more susceptible to accumulation of fluid, and the time required for the fluid to disappear following the feeding of glucose became greater and greater.

One of the most interesting and common hepatic conditions is fatty liver. The ability of the liver to hold widely varying quantities of fat is one of its most striking characteristics. An excessive fat content occurs under many physiologic conditions as well as pathologic states. Large amounts of fat are found in the livers of many species of animals after a prolonged fast. Feeding of a high-fat diet to mammals results in the storage of an unusually large amount of fat in the liver. Forced feeding of a high-carbohydrate diet to birds, such as the goose, results in synthesis and storage of large amounts of hepatic fat. The feeding of certain specific substances such as the amino acid, cysteine, will produce fatty livers. Certain vitamins under specific conditions will increase hepatic fat content. A hormone in anterior pituitary extracts will produce fatty livers in many species of animals. The inauguration of the egg-laying cycle in birds is associated with an increase of the fat content of the liver. An increase of hepatic fat content occurs in many pathologic conditions, as after loss of the pancreas, after administration of hepatotoxins such as chloroform and in many diseases. Many substances, some of dietary and physiologic significance, will produce a decrease of the neutral fat content of the liver. Among such substances are choline, the amino acid methionine, carbohydrate, protein and pancreatic juice. Alterations of the fat content of the liver are due mainly to changes in the amounts of neutral fat; the phospholipid content remains fairly constant.

While the data as yet are inadequate, a few tentative conclusions can be made in regard to the role of the liver in fat metabolism and the occurrence of fatty liver: 1. Many widely different factors can cause great changes in the amount and kind of fat in the liver. 2. Such changes can occur with great rapidity. 3. It is difficult to determine whether the increased fat content is due to a physiologic condition or to a pathologic state of the liver. 4. Any considerable increase of the fat content, even when produced by physiologic means, appears to impair the liver in regard to some of its functions. 5. This decrease of physiologic capacity appears to be due, at least in part, to the displacement of protein and carbohydrate by fat in the hepatic cells.

In our experiments animals that had fatty livers caused by dietary means were observed to be more susceptible to some substances that injure the liver than animals in which the glycogen content of the liver was high. The results of experiments with alcohol and carbon tetrachloride illustrate this (10). We have given alcohol to dogs to the stage of definite intoxication twice daily for more than 2 years. Animals receiving a well-balanced diet during this time did not show any gross or microscopic hepatic lesions. In animals receiving carbon tetrachloride and alcohol, acute hepatic lesions developed rapidly and cirrhosis was produced with less carbon tetrachloride than was necessary without alcohol. Alcohol in the presence of an adequate diet did not produce any demonstrable effect on the liver, but when food was withheld or when diets predominantly fat were given with the alcohol, the liver rapidly became fatty. With a fat diet that would produce fatty livers in dogs in 6 to 8 weeks, the addition of alcohol caused the liver to become fatty in 2 to 3 weeks.

The acute action of alcohol is also affected by diet, as illustrated by the following: Three series of animals were used. In one a diet was given that maintained the usual normal content of both glycogen and fat in the liver; in a second series, the diet was increased in carbohydrate until the normal glycogen content of the liver was about doubled; in the third series, a high-fat diet was fed until the fat content of the liver was about 50 per cent and glycogen 0.1 per cent. Ethyl alcohol was injected intravenously into each animal. It was found that the animals on the normal diet became intoxicated for a period of about 30 minutes on the equivalent of 2 cc. of 95 per cent alcohol per kilogram body weight; the animals on the high-carbohydrate diet gave evidence of only momentary intoxication after the injection of 2 cc. per kilogram while the animals on the high-fat diet went into coma or died after the injection of 1.5 cc. per kilogram.

VITAMINS AND THE LIVER

A discussion of diet today would be incomplete without mention of vitamins. It is perfectly justifiable to discuss vitamins in relation to the liver because this organ appears to have an important role in regard to several of such substances and specific vitamin

deficiency may be associated with the development of hepatic lesions. As would be anticipated, the liver has a major role in regard to storage of vitamins and many of these substances are found in relatively large amounts in hepatic tissue. Synthesis of at least one vitamin occurs in the liver. Here also appears to be the site in which some of the vitamins cause part of their effects. The synthesis of fat from other food materials appears to occur in this organ in the presence of specific vitamins. Vitamins are also affected by injury to the liver as indicated by their increased excretion after the administration of a hepatotoxin.

Injury to the liver may also decrease or abolish the action of a vitamin. This is well illustrated by the results of an investigation by my colleague, Dr. Bollman, and his associates (11). The purpose of their investigation was to determine if there was a correlation between the condition of the liver, the occurrence of a deficiency of prothrombin and the subsequent utilization of vitamin K. It appears well established that proper administration of vitamin K and related compounds will in most instances prevent or control hemorrhage resulting from a deficiency of prothrombin. Bollman and his associates produced hepatic injury in rats by a uniform exposure to a known concentration of carbon tetrachloride. After the production of hepatic injury, vitamin K was administered. They found that severe hepatic injury was invariably associated with a deficiency of prothrombin in the circulating blood. If the hepatic injury was sufficiently severe, vitamin K was not effective in correcting this deficiency of prothrombin. These results would indicate that the liver is of fundamental importance, not only in the formation of prothrombin, but also in the metabolism of vitamin K.

Lesions of the liver occur in some vitamin deficiencies. Fatty degeneration of the liver has been produced in the guinea-pig and the rabbit by diets devoid of vitamin C but otherwise adequate. Fibrotic livers have been noted in rabbits on diets deficient in the B complex.

An interesting investigation in this connection has recently been concluded by my colleague, Dr. Higgins, and his associates (12). The primary purpose of their research was to study the effect of feeding human diets, to which had been added certain vitamins, to laboratory rats. Briefly, their results in relation to the liver are as follows:

A basal human diet, composed of foods consumed by large portions of our industrial populations, as learned by extensive surveys of food purchases in several large industrial centers, was selected. Five diets, which differed from one another only in the flour from which the bread component was made, were prepared for rat consumption. In the basal diet, the bread was made of patent white flour. In the second diet, thiamin was added to the white flour in amounts sufficient to equal that found in whole wheat flour. In the third diet, thiamin and riboflavin were added to the patent flour. In the fourth diet, thiamin, riboflavin and nicotinic acid were added to the white flour in amounts to conform to the government recommendations. In the fifth diet, the bread was made of whole wheat flour. Chemical assays were made to determine the thiamin and riboflavin contents of all diets before the feeding experiments began. Levels of these fractions in the basal diet were very low. These 5 diets were fed to 5 groups of rats for 14 weeks. Growth curves were plotted. At the end of this time all animals were killed and sections of the liver were prepared.

In the animals eating the basal diet, low in thiamin and riboflavin, pathologic changes were marked. There was extensive peripheral necrosis. The cells were extremely vacuolated and in many of them the cytoplasm appeared greatly injured, only the isolated nuclei persisting. Only a narrow margin of normal parenchyma remained around the central vein.

In the animals eating the diet containing added amounts of thiamin, no improvement in the condition of the liver was noted. The addition of thiamin and riboflavin improved the condition of the liver somewhat, for the normal-appearing zones around the central veins were larger than in animals eating the basal diet, but peripheral necrosis still persisted.

The addition of thiamin, riboflavin and nicotinic acid to the diet protected the liver against any damage. The cells of all lobules were normal and one could not detect any difference between the livers of these and those of animals eating the standard rat ration. Furthermore, the animals fed the human diet including whole wheat bread had normal hepatic patterns.

Briefly, the study showed that a pathologic condition of the liver will develop in rats fed a diet in which the three fractions of vitamin B are low. The addition of these three fractions appeared necessary to maintain normal hepatic tissue.

PROTEIN AND THE LIVER

In the foregoing part of this paper I have emphasized the importance of carbohydrate and fat, not because protein is unimportant, but because the other two foodstuffs appeared to illustrate opposite effects in relation to my subject. An adequate amount of protein is probably more important than either fat or carbohydrate in regard to the liver because it is essential for the maintenance and regeneration of the hepatic tissue itself as well as being the source of material from which the liver manufactures protein substances for use by other tissues of the body, and substances for fuel. Protein deficiency of the liver and body is a serious condition, as has been so admirably demonstrated by Whipple (13) and his associates (14, 15, 16). The results of these investigations would appear to be very valuable in relation to the patient who has hepatic disease in which a protein deficiency exists. However, the hepatic activities in regard to protein appear to be difficult and costly for the hepatic cell to perform and since the protein in the diet not needed for use as body protein is eventually utilized mainly as carbohydrate, it would appear that the excess protein causes an added work load on hepatic cells which may be injured. Furthermore, many protein foods, such as meat, contain substances which appear to be deleterious to the functioning of injured hepatic cells.

SUMMARY

In concluding I should like to condense the more important material I have presented in regard to the relation of diet to the liver as determined by experimental investigation as follows: The liver is of prime importance in relation to ingested food. The quantity and quality of the food are important factors in determining the phases of hepatic activity at any particular time. Alterations of activities of the liver as a result of changes of diet occur with great rapidity. These

hepatic activities have primarily to do with the storage, manufacture and regulation of the food supply to the body. Protein is important because it is the foodstuff that is essential for the formation and regeneration of the hepatic tissue as well as other tissues of the body and because it can be utilized as fuel. Carbohydrate, in the form of glycogen in the hepatic cell, appears to be the food that is most readily available and most easily utilized by the body. Its presence in the liver ensures a quickly mobilizable and physiologically inexpensive source of fuel that can be easily metabolized by the body. It appears to protect the hepatic tissue mainly by conserving the protein content of the organ. It has not been proved that the glycogen in the liver is of value other than as a normally indispensable storage material.

The neutral fat in the liver also appears to be only storage material but is less readily available than the glycogen. The fact that the content of phospholipids remains fairly constant in the hepatic cell would appear to indicate that they serve purposes other than that of storage. The decrease of functional reserve of the excessively fatty liver would appear to be partially due to the crowding out of the reserve stores of protein and glycogen from the hepatic cells by the accumulated fat. It should be noted that an excessive amount of glycogen in the hepatic cells also appears to decrease their functional capacity.

Time does not permit the discussion of hepatic function in relation to water metabolism and diet although there are some significant data on this subject. It should be noted that all the data presented have been obtained by means of experimental investigation. The human being may not react exactly the same as other species of animals.

From the physiologic viewpoint, any diet, whether designed for normal or sick persons, should conform to certain basic requirements. It must be adequate in caloric content and satisfy the minimal requirements of protein, carbohydrate, fat, vitamins and water. A certain minimal amount of all these substances is essential for normal physiologic activity. The total caloric value of the minimal amounts of the major foodstuffs necessary for normal physiologic processes is not sufficient to supply all the energy requirements of the body. It would appear from the results of our experimental investigations that both in regard to the protection of the liver from hepatotoxins and in sustaining the functional activity of the impaired organ, the caloric intake required, in addition to the amount obtained from the minimal amounts of protein and fat necessary for maintenance of normal physiologic processes, should be derived from carbohydrate.

Practically, diets in relation to the liver are prescribed mainly to aid hepatic functions in the presence of hepatic impairment. The results of our experimental investigations would indicate that palatable diets, high in caloric content, high in carbohydrate, adequate in protein, supplemented with vitamins and low but not lacking in fat would best suit such a purpose. The food should be given frequently and be of amount and character which would force the entire intestinal tract to function in the process of its digestion.

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Exhibits by Dietitians

A series of exhibits entitled "Nutrition and Diet Prescriptions in Wartime," arranged by members of the Philadelphia Dietetic Association and shown at the Post Graduate Institute, Philadelphia County Medical Society, Philadelphia, May 11–14, consisted of the following:

Exhibit A. The purpose of this was to provide physicians with suggestions for determining whether their diet prescriptions would require additional points for rationed foods. Two diet prescriptions and the amounts of actual foods to fill these were contrasted: the first, calling for 70 gm. protein, 1500 cal., limited carbohydrate daily, was shown to require no extra points; the second, prescribing 100 gm. protein, 2500 cal., limited carbohydrate daily, was shown to require 8 extra points (red stamps) per week. Appropriate explanation of the procedure followed in evaluating the diets for points for rationed foods accompanied the exhibit.

Exhibit B emphasized the extent of individual food waste. An individual food service was shown in which wasted food, consisting of undissolved sugar in coffee, milk left in glass, etc. amounted to ½ lb., or 296 calories. From this, the total food waste for a family of 4 for one week was calculated, showing that under such conditions the value of the food wasted represented a loss of $2 weekly.

Exhibit C demonstrated how an unfamiliar food (soybeans) can be a good source of unrationed protein. The beans were exhibited in dry, soaked and cooked form with accompanying recipes and food value charts.

A committee composed of members of the Pennsylvania Dietetic Association, the Philadelphia Dietetic Association, the Pennsylvania Nutrition Council, and the Division of Nutrition of the Pennsylvania Department of Health recently made a survey of the food left on plates in the nurses' dining room of a large hospital. A typical meal was served, cafeteria style, to 130 nurses who were unaware that the food waste was to be measured. Tabulation of the total food waste follows: meat (beef) 4 lb. 2 oz.; potatoes 4 lb. 7 oz.; carrots 4 lb. 3 oz.; cole slaw 2 lb. 9 oz.; bread 15 oz.; butter 7 oz.; milk 3 cups; chocolate pudding none.

It was estimated that the total food wasted would supply the needs of a soldier for 3¼ days. An account of the experiment appeared in the May 12 Philadelphia *Evening Bulletin*, in which Lillian Hack, president of the Philadelphia Dietetic Association, is quoted as stating that food waste among nurses is comparatively small, since they are trained to be food conscious. According to Miss Hack, "Thoughtlessness and lack of imagination are usually responsible for wasting. . . . Of course, proper preparation and serving and a peaceful atmosphere in which to eat have something to do with it, too."

A SURVEY OF THE DIETS OF WEST COAST INDUSTRIAL WORKERS[1]

MARY ELLEN TURLAY, B.S.

The following report, while based on the findings of the Committee on Nutrition in Industry of the Alameda County Nutrition Council, does not constitute an official statement of the committee. Miss Turlay, Assistant Dietitian, Samuel Merritt Hospital, Oakland, California, and member of the American Dietetic Association, is a member of this committee which was formed to conduct a survey to determine the nutrition status of industrial workers in the county, to distribute this information, and to make recommendations for a better nutrition program in local industries. In the preparation of the report in this issue, Miss Turlay acknowledges the technical assistance of Margaret Kirkland, Record Librarian, Samuel Merritt Hospital; and J. Kasanin, M.D., Psychiatric Clinic, Mt. Zion Hospital, San Francisco. Credit is also due the following who assisted the committee in making the surveys: Cecil C. Cutting, M.D., Permanente Foundation, Oakland; Hannah Peters, M.D., Field Hospital, Permanente Foundation, Richmond, California; Ethel MacDonald, Cafeteria Manager, General Cable Company, Oakland; and Ralph Henricus, Health and Welfare Department, Moore Dry Dock Company, Oakland.

IN THE first quarter of 1943 two surveys were completed. The first, which dealt with the breakfasts of workers, covered one plant employing 1000 men and women. Workers were asked questions such as: (1) Did you have breakfast this morning? (2) Which of the following items did you have: fruit, cereal, snail (a regional phrase used to denote any hot sweet bread served for breakfast, *e.g.* cinnamon roll), doughnut, toast, egg, bacon, ham, coffee, milk? Of the 552 workers interviewed, 61 had eaten no breakfast. The physicians attached to a local industrial hospital who routinely took dietary histories, the state nutritionist, and the councilors in the shipyards agreed that many workers do not eat breakfast. The reasons as determined by the survey are: (1) they have become accustomed to not eating before going to work, (2) they do not understand the importance of a good meal in the morning, and (3) they have no place to eat. One man when questioned said he ate no breakfast because "it takes too much energy to digest it." Another said, "If I eat breakfast, I get so hungry by 9 o'clock that I can't work."

Obviously, much educational work must be done so that workers will better understand the value of a hearty breakfast and the advantages of between-meal snacks. However, the difficulty in obtaining this meal is probably the most important reason why workers do not eat an adequate breakfast. Many live in rooming-houses with no cooking facilities or in boarding-houses located as far away as 50 miles from their jobs. This means that day shift workers must have breakfast at 5 or 6 o'clock in the morning. Very few of the boarding-houses or even the restaurants serve breakfast early enough for these workers. Moreover, only a few of the plant cafeterias serve at such an early hour. The fact that over 10 per cent of those who answered the questionnaire had eaten no breakfast seems to indicate that any large-scale feeding program must provide for meals before each shift begins and for an educational program designed to teach the worker the importance of the right kinds and amounts of food.

In evaluating the breakfasts of those who routinely ate this meal, any combination of foods which included two of the following items: fruit, milk, cereal, ham, or egg, and additional food to supply 500 calories, was rated good. Any combination of foods that included one of the above items and additional food to supply 350 calories was rated fair. A breakfast which had none of the above items or supplied less than 300 calories was rated poor. Those who ate no breakfast at all were included in the "poor" class. When tabulated, the questionnaires showed that 63.9 per cent of the breakfasts were poor; 21.9 per cent were fair; 14.2 per cent were good.

If we are to have a clear idea of the nutritional status of defense workers we must also know where and what kind of lunches they are eating. A committee of the San Francisco Labor Council[2] recently reported the results of an investigation of the eating facilities for 176,000 shipyard workers in 7 Bay area yards. It was found that at present (May 1943) not more than 15,000 meals a day are served in the yards. Thus less than 9 per cent of the workers are able to obtain any kind of food within the shipyards. Specifically, the report cites the following conditions: At Bethlehem Steel Company yards there are 18,000 workers who are served by 30 food dispensaries supplying only 5300 meals on 3 shifts. There is no place to sit down to eat and there is no hot liquid available other than coffee. At Marinship, with 18,000 workers, there is a "shipyard" cafeteria but it is located 2 miles from the ships under construction. Consequently it is patronized only by workers on their days off and by workers' families. At this yard 15,000 box lunches are sold daily. At Moore Dry Dock Company 35,000 workers are served by 8 food dispensaries located throughout the yard and a central cafeteria which seats 500 on 2 shifts daily. The feeding plan here is good, but as yet the facilities are inadequate to take care of all the men. The 25,000 workers at Richmond yard #1 may buy food from 5 food wagons which circulate around the yard. However, these carts actually give service to only 1500 on 3 shifts. Richmond yard #2, with 30,000 workers, has but one cafeteria which is open only to officials and office workers. At Richmond yard #3 the only food dispensary for 25,000 workers is one small wagon outside the gates and the workers are not permitted to leave the yard at the noon hour! At Richmond yard #4 there are no eating facilities at all for the 25,000 workers.

Obviously, when such conditions exist, most of the workers must carry a lunch. Those who do not live at home must buy a lunch before going to work. Lunches may be purchased from restaurants and from food vendors outside the yard gates, most of whom obtain the lunches from 3 commercial companies. In a second survey conducted by the Committee on Nutrition in Industry, box lunches sold by food vendors at the shipyard gates were evaluated. The Health De-

[1] Received for publication May 27, 1943.

[2] This report appeared in part in the San Francisco *Chronicle*, p. 17, May 14, 1943.

partment of the Kaiser shipyards and the Welfare Department of Moore Dry Dock Company volunteered to supply us with samples of the lunches sold in their yards. The food was removed from the labeled boxes, identified by numbers and examined by the committee. Samples were inspected during two intervals: March 22–25 and April 6–8. In all, 90 lunches were evaluated.

Since the National Research Council recommends that the midshift meal served in a factory cafeteria supply one-third of the daily requirement of calories, protein, minerals and vitamins, this was accepted as the standard for a nutritionally adequate box lunch. The Standards Committee of the Alameda County Nutrition Council estimated that shipyard workers in this area need 3000 to 5000 calories a day; 80 to 90 gm. protein; 6000 to 8000 I.U. vitamin A; 80 to 90 mg. ascorbic acid; 1.5 to 2.5 mg. thiamin; 2.5 to 3.5 mg. riboflavin; .68 to 1 gm. calcium; and 10 to 12 mg. iron. Phosphorus, and other factors of the B complex were not calculated because it was assumed that if the protein were adequate there would probably be enough phosphorus and if sufficient thiamin and riboflavin were present in natural foods, the other factors of the B complex would also be present in adequate amounts.

It was found that each company made up practically the same lunch every day. (It seemed probable, incidentally, that the monotony of the lunches was one of the major reasons why the workers complained so bitterly about them.) According to the standard set forth above, from a nutritional point of view all the lunches were inadequate in vitamin A, thiamin, riboflavin, and calcium. The best lunch supplied an average of 1000 calories; 20 to 40 gm. protein; .1 to .4 gm. calcium; 3 to 5 mg. iron; 100 to 1000 I.U. vitamin A; 100 to 300 mcg. thiamin; 6 to 60 mg. ascorbic acid; 200 to 600 mcg. riboflavin. In the other lunches the values averaged even lower. Even when allowance is made for the variations of mineral and vitamin content from sample to sample, it is obvious that these lunches did not supply adequate food values. The contents of typical lunches from 4 companies, representing a fair sampling of those available, are shown in Table 1.

Lunch #9 was rated best because it consistently approached the standard. It was packed by a cafeteria for the Maritime Commission under a limited-profits contract. All the other lunches were rated moderately to grossly inadequate since the thiamin, vitamin A, riboflavin, calcium and protein values were low. In view of the shortage of fats and the increased use of carbohydrates, it was suggested that the thiamin content of the diet needed to be high if maximum efficiency and health were to be maintained.[3] The Committee on Nutrition in Industry concluded that, in general, these box lunches were not satisfactory midshift meals for a man or woman doing hard physical labor.

Another factor which influenced the evaluation of these box lunches was the fact that many of these workers have

TABLE 1

Content of typical lunches made up by four companies

#1, cost 30¢	#6, cost 35¢	#7, cost 25¢	#9, cost 25¢
2 slices white bread 4 slices dark bread 1 oz. bologna 2 oz. meat spread ½ tsp. butter 2 small doughnuts 1 medium orange 3 oz. potato salad	4 thick slices white bread 1 oz. bologna 1 oz. chopped egg 1 tsp. butter 2 oz. white cup cake 1 medium orange 3 oz. macaroni salad	6 thin slices white bread 1 oz. bologna ½ oz. deviled ham ½ tsp. mayonnaise 1 small apple 1 fried apple turnover	6 thick slices white bread 1 oz. peanut butter 1 oz. cheese 1 oz. bologna 1 tsp. butter 2 oz. macaroni salad 1 chocolate mint 1 medium apple
4 thin slices dark bread ½ oz. bologna 1 oz. chopped egg ½ tsp. butter 2 small chocolate cup cakes 1 small apple 3 oz. macaroni salad	4 slices white bread 2 oz. ham and egg spread 1 oz. bologna 2 small doughnuts 4 oz. pudding 1 medium orange	5 thin slices white bread 1 thin slice dark bread 1½ oz. bologna ½ tsp. mayonnaise 1 small orange 1 fried cherry turnover	6 thick slices white bread 1 oz. jelly 1 oz. cheese 1½ oz. bologna 1 tsp. butter 2 oz. macaroni salad 1 small orange 2 chocolate cookies 1 chocolate mint
2 slices white bread 2 slices dark bread 1 oz. bologna 1 oz. meat spread ½ tsp. butter 1 fried apple turnover 4 oz. custard 1 medium apple	4 slices white bread 2 tbsp. peanut butter 1 tbsp. jam 1 oz. bologna 1 piece jelly roll 1″ x 4″ 1 small apple 4 oz. potato salad	5 thin slices white bread 1 thin slice dark bread 1 oz. bologna 1 tsp. cheese spread ½ tsp. mayonnaise 1 small orange 1 fried apple turnover	6 thick slices white bread 1½ oz. cheese 2 tbsp. peanut butter 1½ oz. bologna 1 tsp. butter 1 small orange 2 small cookies 1 small stalk celery

[3] Cowgill, G. R.: The need for the addition of vitamin B_1 to staple American foods. J. A. M. A. 113: 2146, 1939. Williams, R. D., Mason, H. L., and Smith, B. F.: Induced vitamin B_1 deficiency in human subjects. Proc. Staff Meeting, Mayo Clinic 14: 787, 1939. Williams, R. D., Mason, H. L., Smith, B. F., and Wilder, R. M.: Induced thiamine (vitamin B_1) deficiency and thiamine requirements of man: Further observations. Arch. Int. Med. 69: 721, 1942.

a history of poor diet and borderline deficiency manifestations. A considerable number have come from other parts of the country, particularly from the South and Southwest where, as studies have shown[4], the nutrition level is low. When they came to this area, they found work requiring hard physical labor. At the same time they continued to consume an inadequate diet. Thus it was inevitable that the result would be reflected in high accident rates and high percentages of absenteeism. Moreover, the national food rationing program was set up to provide about 3000 calories for each adult, but many shipyard workers actually need 5000 calories or more a day. The only solution of this problem lies in the provision of additional food by industrial cafeterias or other in-feeding programs.

After the commercial box lunches had been evaluated, they were identified and letters of recommendation were sent to each company from whom we had a fair sample. In general, it was suggested that a good box lunch should contain: enriched white or whole-grain bread; protein in the form of egg, meat, cheese, peanut butter, or beans; 3 ounces vegetable; citrus fruit, dried fruit, or fresh fruit in season; and milk puddings frequently instead of the more common pie and cake. These recommendations have also been given to three of the local industrial plants where the management wished to work directly with the box lunch companies. The Committee on Nutrition in Industry is now in the process of surveying some of the home-packed lunches carried by the workers, the results of which (May, 1943) are not yet available.

In the San Francisco Bay area it is becoming increasingly apparent that there is a crucial need for better feeding facilities in the defense plants and shipyards so that every employee can receive nutritionally adequate food at prices to which he is accustomed. A series of conferences with representatives from the labor unions, management and nutritionists have revealed some of the factors which are delaying the development of the in-feeding program. These factors are: (1) uncertainty about food distribution to new factory cafeterias; (2) actual food shortages; (3) difficulties in securing adequate equipment; (4) labor shortages; (5) unwillingness of management to admit that production would increase and absenteeism decrease if the workers were better fed. Very recently FDA has taken definite steps to remedy the difficulties caused by priority numbers, ration points and food shortages. There is a shortage of kitchen help, partly because there is such a discrepancy in the wages paid a woman welder and a waitress. However, the greatest task is to convince management that part of its responsibility is to see that facilities for feeding the workers are provided. It is encouraging to note that the labor unions are becoming more aware of the relationship between good food and good work. Moreover, we now have a few figures on the decrease in absenteeism and accidents in those plants in this state which have already started to provide suitable between-meal nourishments or adequate midshift meals as part of their health and welfare programs.

One of the functions of a committee on nutrition in industry is to further in all possible ways the rapid development of large-scale feeding programs in all war industries. In this area more surveys of food conditions along with recommendations designed to improve cafeterias already established, and wider distribution of all published material dealing with methods and results of successful in-feeding programs are needed.

[4] Borsook, H., Alpert, E., and Keighley, G. L.: Nutrition status of aircraft workers in Southern California; clinical and laboratory findings. Milbank Mem. Fund Quart. April 1943. Wiehl, D. G.: Diets of a group of aircraft workers in Southern California. *Ibid.* October 1942.

Fat

Fat is the food with which excess may well be dangerous, but leaving out what is needed is fatal. Fat improves the taste of everything. It is the good cook's delight. For the vigorous, it invites overindulgence; even if it does not "burn in the flame of the carbohydrate" both are very compatible (as the obese well know) and energy is released without the specific dynamic action loss characteristic of protein. Fat spares all reserves, including vitamin B and protein. But when it isn't properly utilized, it clogs up the liver.

Biochemists and physiologists are baffled in attempts to trace fat through the human body and understand its interrelations with other food elements. In contrast, a lay knowledge which coined the phrase "living on the fat of the land" acclaims a great and popular appreciation of fat. The housewife chooses the beef where the muscle is well interlarded with white fat. Her husband chooses brown ties to match the gravy. For heavy work in low temperatures where much energy is expended, fat is the chief resource. Finnish woodsmen in northern Minnesota have shown me how they choose the fattest of salt pork; with amazingly sharp knives they sliced this off and sandwiched slabs of it between the bisected halves of firm, hard loaves of bread. As they took a bite through this sandwich, I was told that some with inadequate teeth used the same sharp knife to sweep the mouth free from the segment without displacing a single whisker! . . .

Interest centers in the background of what cholesterol phagocytosed into the subintimal layers of the coronaries may later do in encouraging coronary inadequacy, sclerosis and thrombotic pluggage. . . . Perhaps certain systems are surfeited with fat, and strawberry gallbladder and stones may not be the greatest insult resulting. . . . Patients with gout (attacks precipitated by rich fatty foods) are very liable to coronary sclerosis. Such clinical evidence should not be undervalued, at least until more is known about fat metabolism. It is my opinion that, if 10 per cent of the necessary calories for the inactive elderly person are derived from fat, the bodily needs will be safeguarded. Some criticism of the higher caloric intake now advised for our recruits and practiced by our athletes is heard. There is the immediate effect (weight and mobility of recruits) and the remote effect (habits of eating during forced exercise) incompatible with later sedentary lives.—*Tuohy, E. L.: Handbook of Nutrition: XX. Feeding the Aged. J. A. M. A., 121: 42, 1943.*

DIETARY EVALUATION OF ANIMAL PROTEINS FROM THEIR AMINO ACID CONTENTS[1]

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NUTRITIONAL inadequacies of the average American dietary have been pointed out in food surveys made by federal agencies (1, 2). Evidence recently published (3) "warrants the conclusion that dietary inadequacies and malnutrition of varying degrees are of frequent occurrence in the United States and that the nutritional status of an appreciable part of the population can be distinctly improved. If optimal nutrition is sought, not mere adequacy, then widespread improvement is possible." Likewise, reports of dietary conditions in industry (4) and the food and nutrition of industrial workers in wartime (5, 6) indicate that large numbers of industrial workers are not getting enough food of sufficiently high nutritive quality to ensure well-nourished and efficient bodies. It becomes necessary, therefore, to improve the national dietary if an efficient, all-out war effort is to be exerted. With increasing food restrictions because of shortages and rationing, the problem of improving the dietary and health of the nation becomes weightier. A nationwide nutrition program, to be effective, demands fuller scientific information concerning food values and body needs.

The importance of adequate mineral and vitamin intakes is frequently stressed. Equally worthy of consideration, but less often emphasized, is the need of an adequate daily protein consumption (6). Mild dietary protein deficiency seldom leads to characteristic clinical symptoms (7) and it is this situation that makes protein undernutrition insidious and difficult to diagnose without the aid of elaborate chemical studies. During World War I the diets of impoverished Europe failed to furnish enough protein of good quality. The severe protein deficiency resulted in many cases of lowered serum protein concentration with consequent nutritional edema. A chronic low-grade deficiency in serum proteins among children of the low economic groups in the southern part of the United States has been shown by Dodd and Minot (8).

What fractions of the protein molecule are responsible for reduced serum protein and edema remains to be determined. With more knowledge of the amino acid content of various foods and tissues of animals at different ages and stages of development[2] we will be supplied with the tools for evaluating further the role of one or another of these essential amino acids. Complete deficiency of any one of the essential amino acids produces well-known symptoms in experimental rats and chickens, but not yet have we been able to distinguish the less prominent symptoms produced in human beings by a diet containing suboptimum amounts of one or more of these components of protein. It is not presumptuous to suggest that in coming years the clinician with the aid of laboratory data will be able to diagnose amino acid deficiencies. It has already been shown that a negative nitrogen balance occurs in human beings maintained on a diet deficient in one or more essential amino acids and that when these are added to the diet the subject regains a positive nitrogen balance (9–11).

One of the most significant advances in the science of nutrition has been the awareness of the nutritional importance of the individual amino acids for general structural and functional needs. Noteworthy developments in this field were made by pioneer workers: Carl Voit was concerned with the "protein minimum" or the amount of general, undifferentiated protein nitrogen necessary for good nutrition; Fisher, Kossel, Osborne and others found in analyzing vegetable proteins that they differed in constitution with respect to their more than twenty amino acids; Abderhalden, Osborne and Mendel, and McCollum discovered that the failure of certain vegetable proteins to support animal growth, or even maintenance, is due to their lack of adequate amounts of one or several amino acids essential to the economy of the animal body.

Experiments on the requirements of the body for certain dietary essential amino acids culminated in valuable results by W. C. Rose and associates (12) who used synthetic experimental diets made up of purified individual amino acids. Their experiments demonstrated that 10 of the 22 amino acids generally recognized as components of proteins were indispensable in the dietary of animals. More recently (13) they state that of these acids, 9 (lysine, histidine, leucine, isoleucine, valine, methionine, tryptophane, phenylalanine and threonine) are essential for growth and even for maintenance of animals. "The tenth, arginine, is not necessary for fairly satisfactory growth, but is required for *maximum* increases in weight." In preliminary tests on two healthy men, nitrogen equilibrium was induced by diets containing 7.02 gm. nitrogen, of which more than 95 per cent was in the form of a mixture of the 10 amino acids known to be indispensable for animals. They state that "the fact that equilibrium can be maintained so readily by diets containing only 10 amino acids demonstrates that the *twelve acids, previously shown to be dispensable for rats and dogs, are also dispensable for man.*" By excluding and replacing one amino acid from the diets and increasing the other amino acids sufficiently to provide a constant nitrogen content, Rose *et al.* have demonstrated that valine, methionine, threonine, leucine, isoleucine and phenylalanine are necessary constituents of the diet of man but histidine is not necessary for the maintenance of nitrogen equilibrium in human subjects (13 a).

In investigations on man, Holt and associates (9–11) gave dietaries deficient in methionine, tryptophane and lysine for periods of 2 to 5 weeks and found that the subjects went into negative nitrogen balance a few days after the deficient diet was instituted. Nitrogen equilibrium was promptly restored when these amino acids were supplied. The investigators interpret their results as demonstrating that methionine, tryptophane and lysine are dietary essentials for the human species. Until further evidence is accumulated with man, the 4 amino acids, lysine, tryptophane, valine and methionine, may therefore be considered indispensable dietary components. When current studies are

[1] Condensed from a paper read by Icie G. Macy before the Food and Nutrition Section, American Public Health Association, St. Louis, October 27, 1942. Revised as of May 5, 1943.

[2] Studies are in progress on the distribution of lipid, minerals, and amino acids in tissues from several species at different ages and stages of development.

completed, other amino acids now considered necessary in animal nutrition will be added to the list. Investigations of the amino acid composition of the whole protein mixture of the body and its component parts and the amino acid composition of the whole protein furnished by common foods are needed in solving the problem of the structural role of amino acids. Additional analyses of food proteins will yield significant information concerning the amino acid requirement of man and means of satisfying it.

As a class, the proteins of animal origin are recognized as superior in nutritive value to those of vegetables and cereal grains. This superiority has been attributed largely to the more satisfactory amino acid composition of the animal protein. In the average American dietary, from 40 to 65 per cent of the total protein is obtained from animal sources; of this, 20 to 30 per cent may be from meat, poultry and fish (14). Muscle and glandular tissues are known to possess superior biological value but it is of fundamental importance to know the relative proportions of the essential amino acids in edible meats and meat products, poultry and fish, to be able to choose with reasonable confidence liberal quantities of protein provided by the foods which are available at the present time.

The present paper reports the amino acid content of tissues from animals of 10 different species, beginning with Crustacea and advancing through fish, Amphibia, Reptilia, and Aves to the mammalian tissues commonly found in our meat markets. Not only the muscle but also the organ tissues of beef have been analyzed. From these values we are able to present a comparison of the amounts of 10 amino acids in these foods used throughout the nation, some of which are rationed.

FAT, PROTEIN AND ASH COMPOSITION OF MUSCLE AND ORGAN TISSUES

The data in Table 1 demonstrate that beef organs vary much more widely in fat, protein and ash composition than do the muscle tissues of different species. Beef, veal, lamb and pork muscle had approximately the same amount of protein (21.2 to 21.9 per cent) and of ash (1.2 to 1.3 per cent) when considered on the wet (fresh) basis. On a dry basis the protein contents ranged from 73 to 88 per cent and the ash from 3.9 to 4.8 per cent. With the exception of pork, which is richer in fat, the mammalian muscle meat compositions were similar. There were greater variations between the chicken, frog's legs and fish. There was considerable difference between light and dark meat of chicken, 30.6 and 26.2 per cent protein, respectively, on the fresh basis and 79.4 and 75.0 per cent on the dry basis. The fresh salmon, codfish and shrimp muscle were alike in protein content (23.1 to 23.7 per cent) whereas the dry tissues contained 76.2, 81.2 and 82.5 per cent protein. Salmon contains twice as much fat as codfish and shrimp. Frog's legs had 17.5 per cent and 88.7 per cent protein in the wet and dry tissues, respectively.

All tissues contain fat of two types, triglycerides which comprise the storage or depot fat, and physiological fat which is the essential lipid in cells and cell membranes. From the dietetic standpoint, the triglycerides or depot fat is of primary importance as a concentrated source of energy and for the possible dietary essential fatty acids. Furthermore, it is important for culinary attractiveness and palatability. The physiological or essential cell lipids also contribute highly significant dietary substances such as choline and unsaturated fatty acids.

The ratio of the animal protein nitrogen (in dry, defatted, water-extracted tissue) to the total lipid in the dry tissue (Table 2) ranges from less than one to two. A high ratio indicates a low total fat content and a low ratio indicates a lower protein concentration in proportion to the total fat (Table 1). However, the amounts of the two types of fat vary with the individual tissues; in brain, practically all the fatty material is of the physiological or essential cell lipid type, whereas in muscle the total lipid to a greater extent is comprised of the neutral or storage fat (15).

TABLE 1

Percentage composition of muscle and organ tissues

	WET BASIS					DRY BASIS*		
	Moisture	Total solids	Fat‡‡	Protein†	Ash‡	Fat‡‡	Protein†	Ash‡
	%	%	%	%	%	%	%	%
MUSCLES								
Beef§	73.0	27.0	3.2	21.9	1.2	12.0	81.9	4.3
Veal§	75.9	24.1	2.8	21.2	1.2	11.8	88.1	4.8
Lamb§	73.2	26.8	3.0	21.2	1.3	11.2	78.7	4.8
Pork§	70.2	29.8	6.7	21.9	1.2	22.4	73.7	3.9
Chicken**, light	61.6	38.4	2.8	30.6	1.5	7.0	79.4	4.0
Chicken, dark	64.9	35.1	4.5	26.2	1.5	12.7	75.0	4.4
Turtle††	68.2	31.8	5.5	25.0	1.6	17.4	78.1	5.0
Frog's legs††	80.1	19.9	2.2	17.5	0.9	10.9	88.7	4.5
Salmon††	69.2	30.8	5.6	23.7	1.6	18.3	76.2	5.3
Codfish††	71.5	28.5	2.7	23.1	1.8	7.5	81.2	6.4
Shrimp††	72.1	27.9	2.3	23.1	1.8	8.1	82.5	6.4
ORGANS§								
Beef heart§	76.8	23.2	3.8	17.5	1.1	16.4	76.2	4.7
Beef liver§	65.1	34.9	8.0	23.7	1.6	23.0	69.4	4.6
Beef kidney§	71.7	28.3	4.9	21.2	1.5	17.3	76.4	5.2
Beef brain§	79.2	21.8	11.2	10.6	1.4	51.6	48.4	6.5
Beef lung§	78.7	21.3	3.2	16.7	1.1	14.8	76.2	5.0
Beef stomach§	81.0	19.0	1.5	15.6	1.0	8.0	81.2	5.5

* Dried from the frozen state under vacuum (cryochem process).

† Calculated as nitrogen content times 6.25.

‡ All ash values were obtained from dried raw tissues.

§ Raw.

** Boiled one hour.

†† Boiled 15 minutes.

‡‡ Values are summations of determinations of individual constituents of the total lipid, which are to be reported in detail in a later publication.

AMINO ACID COMPOSITION OF ANIMAL PROTEINS

The detailed procedures in preparing tissues for analysis have been recorded elsewhere (16).

The representative mammalian tissues, beef, veal, lamb and pork muscle, are alike in total protein content and are similar in amino acid composition (Table 3). The values for the soft organs of beef, most of which are edible, show them to be quite similar in composition. The beef organs differ from beef muscle to a greater

extent than the beef muscle differs from the muscles of other species. Kidney and brain, tissues of high physiological activity, are closely alike in amino acid composition and contain less lysine and more cystine than does muscle. The composition of beef heart is similar to that of the muscle of other classes of animals. The organ tissues as a class contain less lysine (5.2 to 6.7 per cent) than the muscle (6.8 to 8.8 per cent). From the data, beef, veal, lamb and pork, now scarce, can be replaced by fish and chicken which tend to be more plentiful and serve equally well as primary contributors of protein to the diet.

TABLE 2

Distribution of amino acid nitrogen in animal proteins—in percentages of total nitrogen

	TOTAL‡ NITROGEN	ARGININE	HISTIDINE	LYSINE	TYROSINE	TRYPTOPHANE	CYSTINE	METHIONINE	SERINE	THREONINE	PHENYLALANINE	TOTAL FAT‡	RATIO OF TOTAL N TO FAT
	%	%	%	%	%	%	%	%	%	%	%	%	
MUSCLE PROTEINS*													
Mammalian	14.7	14.3	3.9	10.4	2.2	1.1	0.9	1.9	4.6	3.6	2.4	14.3	1.0
Fish	15.6	12.8	3.6	10.4	2.1	1.0	0.9	2.2	3.6	3.1	2.4	13.9	1.1
Avian	15.8	14.0	3.9	10.1	2.0	1.0	0.9	2.0	4.2	3.3	2.3	9.8	1.6
Crustacean	15.5	13.1	3.0	10.0	2.3	1.0	0.8	2.0	3.3	2.9	2.5	8.1	2.0
Reptilian	14.2	13.6	3.8	9.2	2.3	1.1	0.9	2.4	5.2	3.6	2.3	17.4	0.8
Amphibian	15.1	13.2	3.6	9.5	2.3	1.2	0.9	1.9	5.2	3.6	2.4	10.9	1.5
BEEF ORGAN PROTEINS*													
Heart	15.0	15.0	3.6	8.5	2.1	1.2	0.9	1.9	4.9	3.4	2.7	16.4	0.9
Liver	13.8	13.3	3.4	7.2	2.2	1.5	1.1	1.7	6.0	3.5	3.2	23.0	0.6
Kidney	14.9	13.8	3.9	7.5	2.2	1.6	1.3	1.6	5.1	3.3	2.9	17.3	0.9
Brain	14.1	12.8	4.3	7.2	2.5	1.4	1.4	1.7	5.9	3.9	3.1	51.6	0.3
Lung	14.7	12.7	3.3	6.9	1.8	1.0	1.1	1.5	5.6	2.8	2.2	14.8	1.0
Stomach	16.0	13.3	2.9	7.0	1.8	0.8	0.8	1.6	5.8	2.8	1.8	8.0	2.0
BLOOD STROMA PROTEINS													
Beef	13.8	12.0	4.0	4.8	1.6	1.2	0.7	1.2	—	—	—	26.0	0.5
Sheep	14.0	11.4	4.7	4.5	1.4	1.0	0.8	1.6	—	—	—	24.0	0.6
Horse	12.9	11.6	4.2	5.4	1.6	1.1	0.8	1.6	—	—	—	20.0	0.6
Hog	13.1	11.4	4.5	5.1	1.6	1.3	1.0	1.5	—	—	—	—	—
Human	13.0	11.8	4.3	5.8	1.7	1.2	0.8	1.4	—	—	—	11.0	1.2
MILK PROTEINS													
Cow's Milk, Whole†	—	8.3	3.2	8.6	3.1	1.2	0.5	2.0	—	—	—	—	—
Casein	14.5	8.4	3.4	8.2	3.2	1.0	0.3	2.0	—	—	—	—	—
Whey	14.2	7.8	2.7	10.2	2.5	1.8	2.0	1.8	—	—	—	—	—
Human Milk, Whole†	—	10.2	2.6	7.6	3.0	2.0	1.8	1.4	—	—	—	—	—
Casein	14.6	7.3	3.4	6.8	3.2	1.6	0.6	1.4	—	—	—	—	—
Whey	13.7	12.2	2.3	8.1	2.9	2.3	2.6	1.3	—	—	—	—	—

* Dried, fat-free, water-extracted (16).

† Calculated from Table IV, Beach *et al.* (19).

‡ In percentage of dried tissue.

Considering the human muscle proteins as possessing the amino acid pattern which the human diet should follow, a comparison with mammalian muscle is of added interest. The only available analyses of human muscle protein are those of Sharpenak (17) whose research attracted little attention, partly because analyses of other animal tissues were not available for comparison. He pointed out that in animals a positive nitrogen balance may be maintained with a smaller amount of protein in the form of meat of their own species than with protein of other species' tissues or vegetable proteins and suggested that when choosing the dietary protein for a human being it would seem best to find a food mixture that follows as closely as possible the amino acid composition of human tissue. Sharpenak presented the amino acid composition of the muscle protein of an 8½-year-old boy, based on analyses of a leg muscle immediately following amputation consequent to an accident. The percentage nitrogen in the tissue protein was 16.25. The amino acid composition of the human tissue analyzed by Sharpenak is similar to the average amino acid composition of mammalian muscle proteins (beef, veal, lamb, pork) reported in this paper. Respectively, the percentage amino acid values were: arginine 8.8 and 6.5, histidine 2.4 and 2.1, lysine 6.6 and 8.0, tyrosine 4.1 and 4.2, tryptophane 2.3 and 1.2, cystine 2.3 and 1.2, phenylalanine 5.3 and 4.1.[3]

Block (18) has analyzed human brain (containing 13.4 per cent nitrogen) for 6 amino acids and found the following percentage composition: histidine 2.3,

[3] Sharpenak also determined valine and leucine on the human tissue protein; 6.4 and 8.9 per cent, respectively.

lysine 4.4, arginine 5.0, cystine 1.5, tryptophane 1.3, tyrosine 3.7. These figures are similar to those found for the brain tissue of 5 others of the mammalian species by the same investigator.

There is extremely little variation in the content of the muscle of the Crustacea, low in evolutionary development, from that of mammalian muscle. The protein composition of the cold-blooded representatives of the animal kingdom closely resembles that of the warm-blooded species. Muscle tissues of the Crustacea, characterized by restricted habitat and elementary digestive apparatus, show the same composition as the muscles of bovines who roam the prairies and possess a complicated gastro-intestinal system. So, through anabolic processes, the simple invertebrates from the products of digestion of a marine diet are able to deposit or organ proteins; arginine and tryptophane were found in slightly smaller amounts. Histidine represented a larger portion of the amino acid nitrogen of the stroma than of the muscle or organ tissues. As a source of 7 amino acids, milk proteins compare favorably with that of mammalian muscle and beef organ tissue on the dry weight basis. From a dietetic viewpoint, meat and milk as sources of amino acids present widely divergent problems which vary with infants, children and adults and are influenced by other considerations such as the intake of water, fat, minerals, and fiber.

The proteins of milk are of special interest: first, because milk, which is naturally elaborated for the purposes of nutrition at a time when requirements for growth are at a maximum, might be expected to possess

TABLE 3

*Percentage composition of tissue proteins**

	TOTAL NITROGEN	MOISTURE	ASH	ARGININE	HISTIDINE	LYSINE	PHENYLALANINE	TYROSINE	TRYPTOPHANE	SERINE	THREONINE	CYSTINE	METHIONINE
	%	%	%	%	%	%	%	%	%	%	%	%	%
MUSCLES													
Beef	15.5	3.5	0.6	6.7	2.2	7.8	4.8	4.2	1.3	5.2	4.4	1.3	3.0
Veal	14.0	1.8	0.5	6.6	2.1	8.4	3.9	4.3	1.2	5.3	4.5	1.2	3.2
Lamb	13.8	2.1	0.1	6.5	2.0	7.5	3.9	4.2	1.2	5.4	4.6	1.2	2.8
Pork	15.4	5.1	0.3	6.4	2.1	8.3	3.8	4.3	1.3	4.4	4.4	1.1	3.1
Chicken, light	16.1	1.8	0.2	6.9	2.4	8.5	3.9	4.3	1.3	4.7	4.7	1.3	3.4
Chicken, dark	15.5	2.2	0.6	6.8	2.2	8.1	4.5	4.2	1.2	5.3	4.4	1.2	3.5
Turtle	14.2	1.3	1.5	6.0	2.0	6.8	3.8	4.1	1.3	5.6	4.3	1.1	3.7
Frog's legs	15.1	0.5	1.6	6.2	2.0	7.5	4.4	4.4	1.3	6.0	4.6	1.2	3.0
Salmon	15.7	1.9	0.7	6.3	2.3	8.8	4.4	4.3	1.4	3.9	4.1	1.2	3.7
Codfish	15.5	2.7	0.6	6.1	2.0	8.1	4.2	4.4	1.2	4.8	4.4	1.2	3.6
Shrimp	15.5	6.7	2.3	6.3	1.7	8.1	4.6	4.6	1.2	3.9	3.8	1.1	3.3
ORGANS													
Beef heart	15.0	2.2	0.9	7.0	2.0	6.7	4.8	4.1	1.3	5.6	4.4	1.2	3.0
Beef liver	13.8	8.0	0.9	5.7	1.7	5.2	5.2	4.0	1.6	6.3	4.1	1.3	2.5
Beef kidney	14.9	1.1	1.1	6.4	2.2	5.8	5.1	4.3	1.7	5.7	4.2	1.7	2.6
Beef brain	14.1	2.9	0.7	5.6	2.2	5.3	5.1	4.5	1.4	6.2	4.7	1.7	2.6
Beef lung	14.7	7.6	1.3	5.8	1.8	5.3	3.8	3.4	1.0	6.1	3.5	1.4	2.3
Beef stomach	16.0	1.3	2.3	6.6	1.7	5.8	3.3	3.8	1.0	7.0	3.8	1.0	2.8

* Dried, fat-free, water-extracted (16).

n the animal's muscle tissues the same variety and almost the same proportional quantities of 10 amino acids as are stored in the muscle tissue of the vertebrates. Animals entirely vegetarian produce the same end results as far as amino acids are concerned as do those whose diet is omnivorus. Thus it would seem that the pattern established early in the evolution of animal life has clung through the ages and reached even to the highest forms.

The distribution of amino acid nitrogen in the protein mixtures of the animal muscles and beef organs is shown in Table 2, together with the distribution among 7 amino acids of nitrogen in human and cow's milk (19), and in the red blood cell stroma proteins of the cow, sheep, horse, hog, and man (20). The posthemolytic residue proteins of the red blood cells of 5 mammalian species are practically identical in their amounts of amino acid nitrogen represented by histidine, arginine, lysine, tyrosine, tryptophane, cystine and methionine. The red blood cell stroma contained noticeably less lysine than did either the muscle

the ideal pattern of amino acid distribution for a given species; second, because a comparative study of the composition of cow's and human milk assists in estimating relative nutritive values. The casein content of cow's milk is almost eight times that of human milk. The whey contents of the two milks are similar. From the data in Table 2 it is evident that whey protein, as a source of 7 amino acids, is equivalent to the casein fraction. Whey protein, a by-product of cheese and other processed foods and of commercial casein used in paints, coatings, plastics, etc., and now discarded in large quantities, could serve this country as a great reservoir of valuable amino acids, minerals and vitamins, especially during the present world crisis.

ESTIMATE OF INTAKE OF AMINO ACIDS BY NORMAL INFANTS AND CHILDREN

The problem of amino acid requirements during infancy and childhood has received little attention, although information upon this subject would be especially valuable during this period of limited food

supplies. With the data obtained in our studies of the amino acid composition of meats and human and cow's milk, combined with the values available in the literature, we have made an initial approach by estimating the intakes of some amino acids by breast-fed infants and by children (Table 4). Both average daily intake in grams and in grams per kilogram body weight are shown. The average intakes of 7 amino acids by 3 normal infants during their fourth and fifth months of life when they received breast milk only (21), are indicated, also the intakes of 12 amino acids provided by the diet given 4 healthy boys, 10 to 12 years old (22). The infants' average daily intakes of histidine, arginine, lysine, tyrosine and methionine represented only small fractions of the children's intakes, and their intakes of tryptophane and cystine approximately one-fourth that of the children. Consequently, on a body weight basis, the children received only 70 and 80 per cent, respectively, of the infants' average intakes of tryptophane and cystine per kilogram. For protein nitrogen and histidine, arginine, lysine, tyrosine and methionine, the children's intakes per kilogram of body weight ranged from 117 to 216 per cent of that of the infants.

TABLE 4

Average daily amino acid intakes of 3 infants and of 4 boys, 10 to 12 years of age

	INFANTS*	BOYS	INFANTS	BOYS
	gm.	*gm.*	*gm./kg.*	*gm./kg.*
Protein nitrogen	1.30	12.99	.21	.36
Histidine	0.128	1.41	.0206	.0394
Arginine	0.416	4.26	.0670	.1191
Lysine	0.516	4.16	.0832	.1163
Tyrosine	0.514	3.46	.0828	.0968
Tryptophane	0.194	0.83	.0314	.0232
Cystine	0.205	0.94	.0330	.0263
Methionine	0.188	2.35	.0304	.0657
Phenylalanine		3.78		.1057
Threonine		2.87		.0802
Valine		2.83		.0791
Leucine		8.65		.2419
Isoleucine		2.77		.0775

* Averages for the fourth and fifth months of life.

If during times of plenty there is evidence that the average American is not well fed, there is every reason to expect that with less abundant and rationed supplies of food the health of the nation may be further jeopardized unless scientific information on food values and human requirements becomes available and is utilized. With the knowledge that mammalian muscle and organ proteins, poultry, fish and milk and its products, supply amino acids in approximately the right proportion, it is now possible to select from these with confidence a dietary which will supply ample amounts of proteins containing the amino acids necessary for body structure and function.

SUMMARY

The amino acid composition of the muscles of 10 members of the animal kingdom (beef, veal, lamb, pork, chicken, turtle, frog, salmon, codfish, shrimp) and some of the soft organs of the beef animal (brain, kidney, heart, liver, stomach, lung) is discussed in relation to satisfying the amino acid requirement of tissue structure and function in man.

The amino acid composition of the red blood cell stroma proteins of man and other mammalia is similar to that of the proteins of muscle meats.

As a source of 7 amino acids the proteins of milk compare favorably with mammalian muscle and beef organ tissue. Whey protein equals the casein fraction as a source of amino acids.

Comparison of the intake of 7 essential amino acids, per kilogram of body weight, by 3 infants, with the estimated intake per kilogram provided by the diet given 4 healthy boys, 10 to 12 years old, demonstrates that the infants received relatively larger intakes of tryptophane and cystine.

The arginine, histidine, lysine, tyrosine, tryptophane, phenylalanine, serine, threonine, cystine and methionine contents of muscle meats indicate that for all practical purposes the commonly used meats are of equal amino acid value with respect to these 10 amino acids. On this basis, fish and chicken may adequately replace beef, pork, lamb and veal in the diet. The amino acid mixture of beef heart protein is similar to that of the voluntary muscles of beef, and beef heart, therefore, can serve equally well as a dietary source of at least 10 amino acids. Other soft organs of beef contain smaller amounts of protein than is found in muscle and show greater differences in amino acid content; however, these organs are good sources of protein as well as superior sources of vitamins and minerals.

Since meat is clearly one of the most satisfactory sources of dietary protein and is similar in composition to human muscle, its amino acid pattern might well serve as a guide in compounding successful protein mixtures from cereal and vegetable sources. This consideration is particularly pertinent in the present emergency when diets of warring nations are becoming more and more seriously restricted in meat content. Although the mammalian muscle meats are restricted, the nation's dietary will be equally satisfactory if liberal quantities of glandular meats, chicken and fish, are available.

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Baltimore Dietitian's Aide Course

According to word received from Miriam C. Connelly, chief dietitian, University Hospital, Baltimore, the first dietitian's aide course in the country was completed under the auspices of the Baltimore chapter, A.R.C., on May 12, by 45 women, after 30 hours of training at Johns Hopkins and University Hospitals and 10 hours of classes at Red Cross headquarters. According to Miss Connelly, the course as presented was based on the Red Cross Dietitian's Aide Course Outline (*see* p. 468 this JOURNAL for June) although it was elaborated to fit local needs. Emphasis was placed on the practical aspects of the course, and all staff dietitians participated in the training of the aides. Each unit of the course was preceded by a short discussion by a staff dietitian to groups of 2 or 3 students at a time. The outline, which was mimeographed after it had been tried out in class, proved very satisfactory. (A limited number of copies are available from Miss Connelly to those interested.) Directions which the aides followed in preparing the Ravdin liquid diet, high-caloric tube feeding, baked custard and junket—diabetic, and plain baked custard, also a chart for analysis of diets, are included in the outline. A work sheet was kept for each student, showing the number of hours spent on each unit of the course. Students were allowed to work as many hours as they desired, but on completion they signed up for definite hours of volunteer service in various Baltimore hospitals.

The Baltimore *Evening Sun*, which carried pictures of the dietitian's aides at work, reported that members of the Baltimore nutrition and nurse's aide programs had served 80,000 hours in 3 months ending May 1. Miss Connelly reports that: "Service rendered by the dietitian's aides since completion of their course has been most beneficial; the aides have worked with splendid spirit; our praise cannot be too high."

SPECIAL DIETS UNDER RATIONING[1]

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IN VIEW of the fact that (June 10, 1943) bread, cereal, fresh fruits and vegetables, certain dried legumes, dried fruits, fluid milk, certain perishable soft cheeses, eggs, poultry and fresh fish are unrationed, the present liberal rationing system should allow sufficient for an adequate diet for the average person and for most of the pathological conditions encountered in a general hospital. Nevertheless there are instances in which the present point allowance is insufficient.

For the past several months physicians and dietitians have been deluged with requests for additional allowances of rationed foods. Because of this, it was thought advisable to review the situation from the point of view of both the physician and dietitian. Mount Sinai Hospital is a large general hospital, consisting of Private, Semi-Private, and Ward Pavilions with a total capacity of over 800 beds. The Out-Patient Department, with an average daily attendance of 900 patients, consists of 60 clinical sections covering the entire field of medicine and surgery. We surveyed these clinics and the chiefs and members of the staff were interviewed with regard to the following questions: "How does the present food rationing system affect the nutrition of the patients in your special field? In what conditions do you feel an extra allowance of rationed foods is indicated?" Not infrequently these questions provoked discussion among members of a group, but as a rule unanimity of opinion was expressed.

Over 100 doctors associated with the following clinics were interviewed (figures in parentheses indicate number of divisions in the clinics):

Allergy—Adult
Allergy—Pediatric
Arthritis
Breast
Cardiac—Adult (2)
Cardiac—Pediatric
Chest
Dental (10)
Ear, Nose, and Throat
Endocrine
Eye (2)
Hematology
Medical (4)
Metabolism
Neurology (2)
Nutrition
Orthopedic (2)
Pediatric (4)
Peripheral-Vascular Disease
Physio-Therapy
Psychiatric (2)
Radio-Therapy
Rectal
Skin (6)
Surgical (4)
Thyroid
Urology (3)

DISCUSSION

A summary of the survey (Table 1) reveals that a great number of pathological conditions are absent from the list, indicating that the physicians interviewed were of the opinion that the present rationing system is sufficient for the maintenance of adequate nutrition in these instances. Certain of these conditions deserve discussion:

Acute Infection: Acute infectious diseases call for high-caloric, high-vitamin diets and may require additional amounts of fats and sugar, and occasionally canned and processed fruits and fruit juices. The amounts requested will vary according to social, financial, and local factors (*see* under this topic below).

Allergy: It was felt that each case of allergy represents an individual dietary problem, and that accordingly, extra allowances of special types of fat, meat, and even canned fruits and vegetables may be indicated. If an individual is allergic to milk products and/or eggs, the protein ratio of the diet has to be covered by meat, poultry and fish; if he is allergic to various types of flours a high-fat quota is necessary to maintain his caloric intake. The type of food indicated must be determined by the doctor after thorough study of the underlying allergens.

TABLE 1

*Conditions in which extra allowances of rationed foods are required**

	SUGAR STAMP	RED STAMPS		BLUE STAMPS
	Carbohydrate	Protein (meat, canned fish, hard cheese)	Fat (fats, oils)	Canned and processed foods (vegetables, fruits, etc.)
Acute infection	yes	no	yes	yes (?)
Allergy	yes	yes	yes	yes (?)
Anemias	no	yes (?)	no	no
Cancer	no	yes	yes	no
Celiac disease	no	yes	no	no
Convalescence	yes	no	yes	no
Diabetes	no	yes (?)	yes (?)	yes (?)
Epilepsy	no	no	yes	no
Gastro-intestinal disorders	no	no (?)	yes	no
Hypoglycemia (idiopathic)	no	yes	no	no
Liver disease	yes	yes (?)	no	yes (?)
Malnutrition	yes	no	yes	no
Nephrosis	no	yes	no	no
Obesity	no	yes	no	no
Skin (pemphigus)	no	no	yes	no
Thyroid disease	yes	no	yes	no
Tuberculosis	yes	no	yes	no
Vitamin deficiency	no	yes (?)	no	no

* Conditions not listed are those which, in the opinion of the physicians interviewed, do not require additional allowances for the maintenance of adequate nutrition. Question marks indicate that extra allowances are required only in certain instances. *See* discussion in text.

Anemias: For primary and secondary anemia a high-protein, high-iron diet is frequently recommended, and for the former, the inclusion of liver a few times a week is advised. In most instances primary anemia can be fully controlled on a normal diet with the addition of adequate amounts of liver extract and in secondary anemia, iron preparations. The squeezing of beef to obtain the juices is expensive and unnecessary. In rare instances of allergy to liver extracts, an extra allowance may be justified (*see* allergy).

Arthritis: The type of diet depends upon the nature of the arthritis. In acute arthritis, chronic infectious, and arthritis deformans, a simple, easily digested diet is desirable. Gout, obesity, malnutrition, and anemia, often associated with the clinical picture of arthritis, are discussed under each of these conditions. In some instances, an alkaline or acid-ash diet is prescribed (*see* below).

Ash Diets (Acid, Alkaline, Neutral): These diets may be used in various conditions such as heart and kidney disease, arthritis, nephrolithiasis, etc. The alkaline-ash and neutral-

[1] The authors acknowledge their indebtedness to Drs. B. B. Crohn, H. Dolger, and D. Ross, and to H. Somers, Supervising Dietitian, and M. J. Henderson, Therapeutic Dietitian, who participated in discussions concerning the rationing problem, and offered valuable suggestions.

Since this study was undertaken a paper entitled "Extra Points for Special Diets" appeared in the supplement to the *Wisconsin Medical Journal*, April 1943, in which the authors have calculated the amounts of food necessary for 8-week periods, under certain pathological conditions. Extra copies of this supplement are available at 10 cents each, on application to the just-mentioned publication, Madison, Wisconsin.

ash diets are amply covered by the present rations. Because of the limited range of fruits and vegetables permitted on the acid-ash diet and the very high protein quota, an additional allowance of meat and cheese may be necessary.

Cancer: It was the consensus that in incurable cancer of any organ, extra allowances of protein and fat are justifiable. In some cases a particularly high fat quota may be necessary, *e.g.* cancer of the tongue, mouth, esophagus, etc., which require a high-caloric, high-fat, liquid diet.

Celiac Disease: In celiac disease, as well as in tropical and nontropical sprue, a low-carbohydrate, high-protein, low-fat diet is used. From the group of nonrationed proteins, only pot cheese, chicken, and some of the lean fish may be used. The extremely high protein quota (up to 150 to 200 gm. per day) can be covered only by an extra allowance of lean meat.

Convalescence: Patients convalescing from operations and after acute infections, such as pneumonia, typhoid fever, etc., are entitled to extra quotas of sugar and fats to promote a high-caloric diet. This extra allowance will be limited for a period of a few weeks or months, as the case may be.

Diabetes: In diabetes, the average diets now used prescribe 150 to 250 gm. carbohydrate, 60 to 80 gm. protein, and 60 to 80 gm. fat per day, and do not require extra rations. This agrees with the views recently published by the New York Diabetes Association. However, some physicians still prefer high-fat, or low-fat and high-protein diets, particularly in cases treated without insulin. Some abnormal conditions associated with diabetes, such as intraglomerular sclerosis, nephrosis, and infections, require modifications entailing extra allowances of protein foods, fruit juices, etc.

Epilepsy: In a certain group of cases, the ketogenic diet, still employed by some, requires an extremely high fat diet, (large amounts of bacon, butter, and cream). Even heavy cream (available only with a doctor's prescription) must be used to make the diet more palatable and ensure the proper quota of fat.

Gallbladder: In the majority of instances the types of diets indicated are essentially low in fat and do not require extra allowances.

Gout: The low-purine diets used at present are low in fat and high in carbohydrate, and are sufficiently covered by the present rations.

Gastro-Intestinal Disorders (Gastritis, Ulcer, Enteritis, Colitis): In gastro-intestinal disorders, a high-caloric intake is frequently indicated. An increased fat ration may be necessary, *e.g.* in malnutrition, pyloric obstruction, etc. In cases of chronic diarrhea of any type, increased protein may be necessary to compensate for the loss of protein caused by hypermotility and poor absorption. In chronic conditions (carcinoma, ulcerative colitis) an extra allowance would be required almost indefinitely; in acute conditions, only for a few weeks.

Hypoglycemia (Idiopathic): According to present opinion, patients in this group do best on high-protein diets. Because of this, an extra allowance of meat and cheese may be indicated.

Liver Disorders: A high-carbohydrate, low-fat diet is still considered the basic dietary treatment in most of the liver disorders. Daily carbohydrate quotas of over 400 gm. may call for extra sugar rations and occasionally for additional canned and processed fruits. Because of the known protective action of some of the amino acids, high-protein diets are also frequently ordered, requiring additional meat and cheese; *e.g.* in cirrhosis of the liver.

Malnutrition: In all conditions associated with malnutrition, a high-carbohydrate, high-fat, high-caloric, high-vitamin diet is given which may call for an extra allowance of sugar and fats. Our impression is that diets up to a maximum of 3000 calories can be maintained under the present rationing system; those over 3000 calories require additional sugar and fat.

Nephritis-Nephrosis: In the nephrotic stage of nephritis a high-protein ratio is indicated and an extra allowance of meat and cheese may be necessary. The other types of nephritic diets, if within normal caloric limits, are sufficiently covered by the rationing system. In regard to neutral-ash diets used for treatment of nephritic and nephrotic edema, *see* "ash" diets.

Obesity: In cases of obesity a low-carbohydrate, low-fat, high-protein diet is the rule. Despite the low-fat ratio, the protein intake may be so high that an additional allowance of meat and cheese may be necessary, as in hypoglycemia, celiac disease, etc. This will be true especially in situations in which, due to economic factors, allergy, etc., large amounts of the nonrationed foods (poultry, fish, soft cheese) cannot be consumed.

Postoperative Diets: In postoperative convalescence, particularly following surgery of the gastro-intestinal tract, a diet of 3000 calories or over is frequently indicated. An extra allowance of sugar and fat may be necessary.

Skin Disorders: In some skin conditions, like pemphigus, tuberculosis, etc., high-caloric, high-fat diets are indicated (*see* also under malnutrition).

Sprue: See celiac disease.

Thyroid: In cases of hyperthyroidism increased sugar and fat quotas are desirable, as in other instances of malnutrition.

Tuberculosis: High-caloric, high-vitamin diet is indicated (*see* malnutrition).

Vitamin Deficiency: Clear-cut, primary vitamin deficiencies are comparatively rare in this part of the country. If encountered they are usually secondary to consuming systemic disease or alcoholism. However, milder (subcritical) forms of vitamin deficiency are met with more frequently. In vitamin A, C, and D deficiency, the important nutrients are not rationed. In vitamin B complex deficiency, in addition to whole-grain cereals, a high-protein ratio may be advisable, involving an extra allowance of meat (liver) and cheese.

Social, Financial, and Local Aspects: The social and financial situation of the individual, too, must be considered in determining whether present ration allowances will allow appropriate dietary treatment. For example, a high-protein diet can easily be covered under the present rationing system if adequate amounts of nonrationed soft cheese, fish, shellfish and poultry are consumed. The latter two items, however, are expensive and exceed the dietary budgets of low-income groups. For similar reasons diets requiring large amounts of fruit, fruit juices and vegetables may justify an extra allowance of these items.

Single individuals in lower income groups who work during the day frequently do not have time to purchase and prepare fresh fruits and vegetables daily. This is particularly true in the case of single men who have been accustomed to using large quantities of canned soups and vegetables because of lack of equipment and consequent difficulty in preparing even a simple meal if it involves processes such as the cleaning and cooking of fresh vegetables.

Rural areas and small towns have always used less commercially-canned foods than is customary in large communities like New York City. The high price of fresh vegetables in the New York area has been mentioned as one of the factors favoring the use of canned and processed vegetables. Rationing boards should consider local conditions as well as individual circumstances when ruling on extra ration allowances due to disease.

SUMMARY

The chiefs and members of 60 clinics of a general hospital covering the field of medicine and surgery were interviewed as to the necessity of extra allowances of certain foods for special diets. In many pathological conditions, adequate nutrition can be maintained on the present rationing system, while in other conditions extra allowances are necessary. These conditions are reviewed and types of additional foods needed are discussed.

Correction. In the recipe for angel cake in the article entitled "Substitution of Georgia Cane Syrup for Sucrose in Cakes," this JOURNAL for July, the amount of flour should have been 9 tablespoons instead of 9 teaspoons.

Editorial

GLIMPSES OF THE ARMY DIETITIAN IN SERVICE

According to recent statements in the lay press, 2900 dietitians will be needed in the Medical Department of the Army of the United States. In view of this the comments of those now in service will be of particular interest. Lieut. Miriam E. Perry, after nearly three years' overseas service, writes as follows:

Although still called a station hospital, we actually serve as a general hospital, having, as we do, all types of patients and diets and an average of more than a dozen kinds of special diets. Ruby Winslow has the responsibility of managing the special diet kitchen which serves both our medical and surgical sections. The main mess, which prepares food for the medical detachment as well as all patients on a regular diet, is operated under the joint efforts of the mess officer, the mess sergeant, and the head dietitian. Our commanding officers, mess officers, and mess sergeants have been most cooperative and the recent shift in the status of the dietitian from civilian to relative military rank has been accomplished with a maximum of smoothness.

We have been fortunate, too, in that our food supplies for the most part have been fairly constant. Naturally the variety has at times been limited, but the quantity has been satisfactory. There was a period—a long time ago—when a little less corned beef, salmon, and sausages would have been most welcome, but it didn't last long and we gained in experience trying to figure out different ways of presenting those three items over and over in the least monotonous manner. We use as many of the native foods as possible and have our problems trying to prepare them in ways that will educate the American palate to enjoy them. The native *yautia* comes in very handy when the potato supply temporarily runs low. We have found that by using potatoes half and half with the *yautia* we can stretch the supply and improve the flavor of the latter. *Chayotes* make a satisfactory substitute for squash when the latter is unavailable as well as being delicious in their own right. Citrus fruit is available most of the time and avocados are inexpensive and available in large quantities when in season. *Papayas* are somewhat like melons of the cantaloupe variety and, served iced with slices of lime, are a more than satisfactory substitute. The "milk" from green cocoanuts, well-chilled, with a small amount of lime juice, is an appetizer to be remembered. We also have available a certain amount of native lettuce from approved farms. Plantains are inexpensive and good served in a number of ways. The pineapples are excellent, especially the large *Pina Pan de Azucar* which means literally "sugar loaf pineapple." Good specimens of these may weigh 10 to 15 pounds. Mangoes, though their season is shorter, add to our variety with their piney pungency. Occasionally a small supply of hearts of palm is available, but because of the cost and the fact that the tree is killed when the pith is removed we have used it only rarely and in small quantities. It is especially good, for instance, as a substitute for celery in a turkey salad. We are using the native coffee now because we prefer it, when weaker than that brewed by the natives.

When we first came to this area our cooks were largely natives with a limited knowledge of English. Since our knowledge of Spanish was nil, obviously one of our greatest problems was to arrange recipes in a form understandable to them. Most of the cooks had previously attended the Army Bakers and Cooks School but on the whole this training, unfortunately, dated back 10 to 15 years. We solved the problem by learning sufficient Spanish phrases as rapidly as possible and typing the recipes in English on the top half of a sheet for English-speaking cooks and repeating it in Spanish on the lower half. We have progressed to the point where we are sufficiently proficient to do this job ourselves. Our Spanish-American cookbook has now grown to quite respectable proportions and we add to it continually, using quantity recipes evolved from family size or borrowing from other sources, the chief one being *Quantity Food Service Recipes* assembled under the auspices of the American Dietetic Association.

The food for the regular diets and the mess hall is prepared in one large kitchen—not a single room, but a large area divided into separate units. The main mess consists of the main kitchen, the bake-shop, the dishwashing room and the combination butcher shop, vegetable preparation and diet room, also the vegetable storage section. These various sections lead from the mess hall like fingers on a hand. The "diet room," located in the butcher shop, is in reality merely the table where insulated food boxes are packed to go to the wards and where there is a set of shelves to accommodate items such as bread, canned milk, and pastries. It is not, needless to say, an ideal arrangement but we have to utilize every inch of space to the best advantage. The food service in the mess hall is cafeteria-style, served directly from a steam-table. We are proud of the fact that the food waste is less than average and we hope to get it even lower.

Our routine of work is much like that of any civilian hospital, at least to the extent that a variety of problems crop up all the time. A short while ago we were faced with the problem of preparing a patient with a severe case of diabetes to return to civilian life, competent to handle his own diet. He was a farmer, living far up in the hills, and furthermore knew no English; in addition his schooling had been limited to a year and a half. He could, fortunately, read and write and understand simple arithmetic. We tracked down the food values of a fair number of the native foods as grown here, added such imported foods as the patient indicated he would be able to obtain, adjusted the foods into groups for flexibility in substituting, put the whole thing into Spanish (learning fully as much, ourselves, in the process!), drew up a skeleton menu and did our best to instruct him—with an interpreter to aid us with our halting Spanish. The facility with which the patient seemed to grasp his instructions was more than we had dared hope for, although we would have preferred to have been able to instruct him over a longer period of time.

Life, though predominantly work, of course, is not all work and no play. Nancy King, Captain, A.N.C., has worked very hard to make our quarters homelike. Our "living-room," which used to be merely a wide porch around the inside of the patio, has been enclosed to protect it from the elements and has been tastefully furnished with easy chairs, little tables *á deux*, and magazines and books. She has arranged a game-room complete with ping-pong table, poker table, dart games and so on, and bridge tables. While we have our problems and disappointments, on the whole our work has been such that we feel as though our post is "the cream of the crop."

Lieut. M. Lillian Nelson, who likewise has been in overseas service, has this to say regarding personal equipment and her experiences:

The first problem confronting the Army dietitian assigned to overseas service is that of clothing and other essentials sufficient to last at least a year or longer. With the government issue of uniforms in effect, the foremost concern is eliminated, although it is understood that summer suits will be needed. An extra skirt is optional yet often practical, since the skirt usually receives harder wear than the coat. Uniform dresses are a welcome change of costume and quite suitable for many occasions. Raincoats are essential, preferably of lightweight material requiring minimum space and large enough to be worn comfortably over a topcoat.

Accessories of all kinds are to a certain extent an individual choice. Slacks are necessary for drilling and the journey across. Incidentally, the dickey is a practical supplement and an answer to laundry worries, especially during travel periods. In the selection of underclothes drying time must be considered as this is of major importance when cramped for space and time. Articles frequently hard to obtain are hose, "Kleenex," specified brands of cosmetics, and insignia. Minor purchases such as soap, cigarettes, candy, etc. can be made at the post exchange.

In this process of equipping one's self, there is a tendency to overstock on some things and understock on others since no one knows what will be available later. The chances are there will be a canteen and some sort of shopping facilities. The best rule is to base your estimate on previous consumption and

allow for emergencies to cover the period before you will be in a position to make purchases, but *don't hoard*.

Duty uniforms as suggested (12 white) seem satisfactory if there is a laundry service. Possibly something like the nurses' seersucker blues for use under certain conditions will be provided.

Housing arrangements overseas depend entirely on the location. The quarters range from tents with no floors, to hotels, dormitories, or whatever is available. If assigned to regular Army barracks, one can live quite comfortably. Some of the women in service have taken mattresses; however, in the majority of instances this seems unnecessary.

Unlike most civilian hospitals, in the Army mess your workers are almost exclusively men. The cooks range from those with regular Army training (and "well-seasoned" with Army tradition, I might add) to the newest recruit who never saw a kitchen except when he sought the contents of the cookie jar. Some have been instructed in the Bakers and Cooks Schools—others are assigned who have had no previous instruction. Occasionally, you have the good fortune (or, is it?) to acquire a cook who terms cooking his chosen profession, in which case you may face a major problem in diplomacy when you attempt to untrain him. On the whole, you will find the cooks eager to learn and willing to correct any faults in technique. Best of all, you need not worry whether Johnny will quit his job and fail to appear on the scene at 5 a.m.

The therapeutic dietitian has a special job of teaching the diet cooks, very few of whom have had suitable preliminary training. To me it has been surprising and encouraging to note the interest of the trainee, how readily he acquires the technique necessary, the pride he takes in the mastery of each new method or recipe, and his eagerness to explain the finer points to others whom he considers not so well versed in the subject. Teaching an ever-changing group of mess personnel, therefore, constitutes an important task for the Army dietitian.

Other duties vary according to the hospital capacity, rules of the commanding officer, and the number on the staff. No matter what your speciality may be, you will find ample scope for your efforts in the Army hospital. Duties range from the purely administrative, in which you are closely associated with the mess officer and mess sergeant on matters of organization, menu planning, food requisitioning, etc., to that of a ward assignment. Fortunately, during my experience overseas I managed to serve in both capacities. It is not my intention to minimize the responsibilities or imply that the problems encountered are few and negligible. Military rank will surely solve some of the problems. But even so the dietitian has yet to establish herself in the Army as she has in most civilian hospitals. Too many in the Army, upon hearing the term, dietitian, still ask in all earnestness, "What's *that*?"

Another more recent recruit, Lieut. Kay Carney, equipped with a Master of Science degree from Columbia University, graduate training at Montefiore Hospital (New York) and at Walter Reed General Hospital, offers the following sprightly comments which attest an indomitable spirit that rises above dour thoughts of an uncertain future, and the saving grace of humor:

On March 16, 1943, I received my commission in the Army of the United States. On March 20, orders arrived to report for duty at Borden General Hospital, Chickasha, Oklahoma. My heart sank. All I could think of was Indians, oil wells, and unending stretches of flat land. The responsibilities that faced me seemed overwhelming. No longer would I be able to go to the chief dietitian's office and obtain a solution to my every problem. No longer would I be able to traverse familiar corridors and have the comforting security of old surroundings. . . . but as the time for departure neared I found myself becoming very impatient to be on the move. When I stepped off the train, a nurse wearing a captain's bars x-rayed me from top to toe until even the butterflies on my hat were quivering and ready to take flight. As soon as I explained I was from Walter Reed Hospital and that my uniform had been ordered and should soon arrive, her stern demeanor melted and she gave me a most cordial welcome.

I was shown to my room in the nurses' barracks. It was a lovely corner room with a new bed, dresser, chair and closet. I tried the bed expecting something hard and unyielding and was agreeably surprised to feel solid comfort beneath me. Already I was making plans for drapes, spreads and scatter rugs and wondering just what color scheme would be best against the stained wood walls. Later—supper in the nurses' mess. What food—it certainly tasted wonderful! There I met the nurse who had been assisting in the patients' mess and who was to help me until my assistant arrived. After supper, I went home with her to hear about the setup. She was so thankful to see me and said she hoped I had a great deal of fortitude as I would surely need it.

After filling in endless forms I was at last ready to begin work. It was a peculiar feeling to find a place so new that there wasn't even any paper in the desk, not a sign of a recipe, or any of the forms so common to a kitchen. I could hardly wait for my trunk to come so that I could begin using a few things from the file I had so carefully collected.

Gradually we got the storeroom filled, also the meat and vegetable boxes, and began to be a growing concern. The cooks soon became accustomed to my menus. While at first they rather resented my tasting their food, they now proudly bring a finished product anxious for my approval.

It has been a long journey from those first 60 patients to the many times that number we now feed. We have yet a great deal to accomplish, but the employees are very cooperative and interested in their work, and together we can make a go of it.

"Together we can make a go of it" might well be a wartime motto for the dietitian so loyally serving in civilian hospitals, beset by mounting trials, as well as for her sister in service whose lot in many ways seems lighter in comparison.

THE INCREASING PRODUCTION AND USE OF VEGETABLE PROTEINS

That cereal and vegetable products must, to an increasing extent, replace what some have called the "luxury" food, meat, in the American dietary, has been stressed by those conversant with the food production situation. For example, at the recent Food Forum conducted by the Dairymen's League Cooperative Association (*see* news section, this JOURNAL) W. F. Myers, economist, had this to say:

In 1942 civilians ate substantially less than in 1935–39 of the cheaper foods such as potatoes, sweet potatoes and dry beans and considerably more of the highly-prized foods such as meat, poultry, eggs, milk and cream. In time of peace such a change in diet would be highly desirable but in wartime it increases the pressure on a limited agricultural output because of the relatively large amount of land and labor required for the production of these concentrated foods. . . . Livestock production has outrun feed supplies. Farmers are already fearful of the inevitable feed shortage and the time has come for a change in policy that will reduce livestock numbers on a selective basis in an orderly manner without disastrous and wasteful liquidation. The 1943 production of meat will be large because much of it is being produced on 1942 crops but the supply will decline when the livestock population is reduced to conform to available feed supplies. . . . The only way to save much food is to increase the direct human consumption of grain and crop products and reduce the civilian consumption of meat. Sooner or later this must become the basic principle of our wartime food program. . . . Animals are not efficient converters of grains and other concentrated feeds into human food although products richer in certain critical nutrients may result. In converting 7 lb. corn into 1 lb. pork about 84% of the energy is lost. With other meats the proportionate loss is greater. In converting into livestock products the grain produced on United States farms in 1942, about 86% of its caloric value was lost without considering the hay, roughage and pasture used as supplementary feed.

Any thought of feeding many additional millions of people on the diet to which we have been accustomed is utter folly. The 6% of our annual production used for Lend-Lease in 1942 would feed about 8 or 9 million people on a luxury diet similar to our own. The same amount of concentrated foods would supplement the diets of a somewhat larger number of people. However, all told, the United States produced enough crops last year so that if all had been fed directly to human beings, they would have provided the caloric requirements for a popu-

lation about three and one-half times our own. . . . Ample stocks of wheat, soybeans, beans and other storable foods should be built up and maintained in the United States to ensure a food supply for European people at the end of the war. This is particularly important in the case of wheat because of wide fluctuations in production due to weather. . . . Any decrease in the use of animal products must be selective in character. Some products are in more concentrated form than others and thus more easily shipped abroad. Some, such as milk, have nutritive values which are especially difficult to obtain in adequate amounts in other foods. Dairy cows, beef cattle, and sheep make use of large quantities of grass and other types of forage which cannot be used directly for human food. Net losses in our total food supply would result if we failed to convert such crops into human food through the use of animals.

By giving proper consideration to the essentials of a good diet, it is possible to go quite a way toward the direct use for human food of grain and other products we are now feeding to livestock. While grain may be less palatable than meat, this is the only practicable way in which we can stretch available food supplies.

M. C. Bond, New York State College of Agriculture, Ithaca, pointed out that the people of the United States normally get about one-fourth of their food energy from vegetables and that in the course of a year they consume about what is produced. Although 1942 vegetable production exceeded all previous years, the amount allotted to civilians was less than from the smaller pack of 1941, and a further reduction in the civilian supply of canned vegetables is expected this year. He suggested that homemakers be urged to can, freeze, and dry during the summer a goodly portion of the vegetables they will need next winter. He also stressed that fresh vegetables should be used while they are in abundance, which calls for a program of information to consumers.

J. A. McConnell, Cooperative Grange League Federation Exchange, Inc., Ithaca, in commenting on the feed situation stated:

One shortage leads to another. As the heavy grain-consuming animals, hogs and poultry, bite deeper and deeper into the feed pile, there is less than the normal amount for the animals whose diet consists of a high amount of roughage, such as dairy and beef cattle. It is, of course, apparent to every thinking man that fairly heavy killing—particularly of heavy grain-consuming animals, such as poultry and hogs—will take place. If we take the drouth years of 1934 and 1936 as a pattern, liquidation would be carried out in the following order: hogs, poultry, beef cattle, dairy calves and heifers, and, last, dairy cows. In those years, the heaviest liquidation was in the western corn belt states and least in the dairy areas.

In regard to the poultry situation, Quentin Reynolds, National Council of Farm Cooperatives, reported as follows:

There is not feed enough to maintain and feed the livestock and poultry population now on farms at rates required to approach food production goals. . . . It will be long before our poultry industry can do the bit required of it to feed the 500 million beyond our own 130 million. . . . If poultry products are short, they must be rationed.

Representing WFA, J. S. Russell, after explaining why some of the goals set by USDA would not be met, added:

New foods are in the picture—vegetable proteins, for example. Mix soya or peanut flour in bread to the extent of 10% of the wheat flour, and the protein value of the bread is increased 4 times. Mixed with pancake flour, soya flour makes one griddle cake as rich in protein as two used to be. In ground meat products, even chemists cannot easily tell how much is meat and how much is soybean or peanut grits.

In another recent commnnication to this Journal received from authoritative sources, the need for protein foods from grain vegetables was again stressed:

It is possible for us to alter the composition of our farm output in the direction of increasing the production of crops that make the most economical and efficient use of our agricultural resources. This does not mean that we shall stop livestock production or that we must condemn ourselves to a vegetarian diet. It does mean that, to sustain this greatly increased population now dependent upon us, we can turn more to vegetable sources of protein and energy, and we shall do so in the near future. After all, the average acre of arable land will feed more humans or animals than the average acre of grassland. An acre of pasture can be expected to produce meat for one person, but under the plow it will produce sufficient wheat for 21 persons or enough potatoes for 42. We customarily derive 60% of our proteins from animal sources, but we need derive only 30% from animals for sound nutrition. We can do very well nutritionally if 60% of our energy comes from carbohydrates. . . . Animals still have their place in our diet, to be sure. They eat much that is inedible for us, by-products, bulky fodder crops, straw, beet tops, grass, beet pulp, even waste products. They transform this into high-quality protein. But, by feeding more grains and more soybeans, peanuts, dried peas, and dried beans to human beings we can maintain our standards of nutrition without depending so heavily on livestock which is relatively uneconomical in converting feeds into human food.

At the Symposium on Nutrition in Wartime in Richmond March 25–27, Dr. Virgil P. Sydenstricker, professor of medicine, University of Georgia, stated that, in his opinion, the rationing of dried pulses was apt to be disconcerting, especially to the people in the South, where cowpeas are an important supplementary food. The use of potatoes, he added, would have to be actively promoted, also other root vegetables and bread, with the hope that people will go to the trouble of eating enough of these to bring their protein intake up to what it should be, with soybeans and peanuts to assist in increasing both fat and protein intake.

Structural and Functional Differences in Alimentary Tracts of Ruminants and Mono-gastric Animals

Pioneer investigators realized early that nutrition of the ruminant was characterized by certain peculiarities not possessed by non-ruminants. Naturally, it has always been assumed that some of these differences were due to structural differences in the alimentary tracts of the two classes of animals. Herbivora in general have in the alimentary canal a large compartment where the bulky fibrous material of their natural diet can be held to soak and ferment. In animals with a simple stomach the colon and caecum are enlarged for this purpose, as in the horse and the rabbit. Ruminants are unique in having a partitioned stomach with four compartments. The first section or rumen becomes especially large in order to hold a great bulk of fibrous coarse food . . . [but its] function . . . is not merely to store a large volume of coarse material for further use. It has been demonstrated that there exists a remarkable symbiotic relationship with lower organisms in the rumen, whereby the animals may be supplied with at least six of the known vitamins of the B complex and at least one other vitamin, K. By conversion into bacteria and protozoa useful protein may be synthesized from nonprotein sources such as urea and ammonium salts. Ruminants can use large volumes of foods too coarse and bulky for other types of livestock and obtain from them some 30% of the energy they contain. They are able to do so by digestion of the fiber carried on by microorganisms in the rumen. Although ruminants normally require roughage, they can subsist without it and are found to be most efficient converters of energy from concentrates. . . . Synthesis in the rumen of certain vitamins and of protein is no longer doubted, but the optimum conditions for their formation need further research.—*Goss, H.: Some Peculiarities of Ruminant Nutrition. Nutrition Abstracts & Reviews, 12: 531, 1943.*

Current Comment

ADJUSTING RESIDENCE HALL FOOD SERVICE TO THE REQUIREMENTS OF THE NAVY

To those facing similar problems, the experiences of two dietitians, who were required to "convert" their college residence hall food services to meet the needs of training units of the United States Navy, will be of interest. Even though a rapidly changing food supply will necessarily change the pattern of the menus and the problems of menu planning as outlined, it is believed that the majority of the adjustments described will be fairly typical of those necessary in other institutions which are called upon to render similar service to the armed forces.

Mildred Bonnell, who has since been appointed industrial nutritionist with the federal Nutrition Division (*see* p. 542 this JOURNAL for July), describes her experiences in changing over to the Navy program at the University of Illinois as follows:

In order to accommodate 300 officers of two Naval Diesel Engine Schools, the women's residence halls, which ordinarily accommodate approximately 300, were taken over. Here linen tablecloths are used and a table d'hote menu is served, using plate service instead of the family-style to which the university residents were accustomed.

At the men's residence halls, where it was planned to house and feed 800 seamen and their officers, the problem of adjustment was more revolutionary. These halls were built to accommodate 370 men. In order to take care of 800 it was necessary to make use of every inch of available space, even a large part of the storeroom and office area formerly used by the food service department. This meant reorganization of food storage to fit a smaller space.

The type of meal service requested for the seamen meant quite a departure from the niceties of family-style service. "Chow" is now served cafeteria-style on the regulation 6-compartment steel trays, with soup and beverages in regulation thick crockery mugs and bowls. Only enough of the original china and glassware was retained to serve the two tables for officers.

It was decided to use a temporary cafeteria counter installation which might easily be removed when peacetime activities are resumed. This consisted of a series of 6 portable carts, in 2 of which 4 individually-controlled, electrically-heated compartments were installed. Individual controls allowed a space which might be unheated if necessary in order to be used for salads. Two flat-topped carts, linked to each end of the heated carts, are used for silver, trays, crockery, bread, butter, and beverages. The carts, arranged end to end for service at one side of the dining room, make a counter about 40 feet long. All carts are provided with open shelves below for storage of cups, bowls and bread.

Eighteen men per minute, on an average, go through the line. The closest supervision of serving maids is necessary in order to teach them to standardize servings and to serve rapidly and carefully so that each food retains its individuality on a compartment tray where the dessert can readily be in too close juxtaposition to the gravy.

It is both a tradition and a fact that the Navy drinks large quantities of coffee, even though a choice of milk or coffee is offered. The original facilities for making coffee therefore proved to be inadequate, and as a temporary measure one of the 40-gallon steam kettles was employed for supplementary coffee-making. The two new 40-gallon coffee-makers with stainless steel linings, equipped with pumps, are temporary installations.

Without an expensive outlay for equipment it would have been impossible to make enough fresh toast to supply the demand. It was decided therefore not to attempt to serve toast at the men's halls. Raisin bread has been a popular substitute.

The original oak tables and chairs of the dining rooms were replaced with folding tables and benches with black masonite tops, requiring less maintenance and increasing the dining room capacity more than 15 per cent. The furniture is not only durable and easy to keep clean but is light enough so that it can be moved during cleaning. As the seamen finish their meals they are required to return their trays and crockery to a metal-topped scraping table with a raised curb, similar to those found in most dishwashing installations, and placed at the end of the dining room nearest the dish-room.

There are specific Navy regulations, to which we strictly adhere, concerning the storage of food. Meat must be hung or placed on trays in a separate refrigerator at a temperature just above freezing. Other refrigerators must maintain a temperature below 42°F. Cooked food must not be held in storage longer than 24 hours. All equipment, food and food service facilities are constantly subject to inspection by the commanding or medical officers of the Navy.

We learned that the problem of planning menus for the Navy was quite different from that of planning menus for university students during wartime. We were not subject to food rationing, but at first we were somewhat overwhelmed by the amounts of food which the Navy recommended as a daily allowance. This allowance was revised later, but at first there was considerable waste in the officers' mess. More cautious servings eliminated waste to a certain extent but it is obvious that plate service will always mean a certain amount of edible food in the garbage pail. The problem has been partially solved by decreasing the size of the first serving and offering second helpings of any food desired.

All menus must be approved by the Naval Supply Officer. All food is requisitioned and purchased according to government specifications through the channels of the university purchasing office. Even though the Naval Schools are not subject to civilian restrictions on meat, we have had some difficulty in obtaining the desired grade, kind and cut on the date ordered. And though these schools have priorities, there are larger Army and Navy stations that take precedence.

Deliveries are a problem, now that the number of local truck deliveries has been reduced and long distance trucks can no longer be counted upon to arrive on schedule. Fresh foods, therefore, must necessarily be ordered well in advance, if we are to have them when needed. Larger stocks of storeroom supplies must also be kept on hand for the same reason, an added problem now that storage space has been decreased.

Our greatest problem, however, is one common to all at present—that of help. Fortunately, it has always been our policy to employ women cooks. Because trained dietitians are scarce, it was necessary to give certain key persons in the organization more responsibility in the supervision of people under them. Ours is a line and staff organization. The head cook, for example, is responsible for all food preparation. She supervises the breakfast and dinner cooks directly and they are responsible for the assistant cooks working under them. The cafeteria service, dishwashing, etc., are organized in the same way. The dietitian in turn is relieved by a woman whose college background included courses in institution management, but whose experience does not qualify her for the title, "dietitian." Instead, she is called "supervisor of meal service."

A number of extra cooks and counter-maids were needed. Since the supply of applicants was less than the demand it was decided to waive the age limit. A cook is a cook and willy-nilly we are glad to have her, whether she be 45 or 60. However, any applicant over 45 is made to understand that the age limit of 45 will be resumed after the war.

Formerly we had employed many university students as dishwashers, porters, etc., thereby permitting them to earn their board. It was necessary to replace them with regular employees because few students are willing to relinquish all holiday periods in order to work for us under our present schedule. It was difficult to find men for the heavy work, but we finally built up a staff of Negro men who were willing to work within our wage range. The more intelligent of these are given the key positions.

At mealtime a number of seamen who are assigned to "mess detail" help to serve beverages and direct the clearing of used trays. Since the crew is changed each day, constant supervision and checking on the part of the dining room supervisor are necessary. The services of the "mess detail" are therefore considered as almost negligible. Like any other institution in these times, we never have enough help.

At the University of Missouri, Marita Monroe, director of residence halls and assistant professor of home economics, found that planning menus for Navy trainees was similar in many respects to planning menus

for men students, but that the problem of preparing and serving a much larger group, especially under wartime labor and equipment restrictions, presented unusual difficulties. These are described by Miss Monroe as follows:

Menus for Navy trainees are indeed different from those served in residence halls to university students, particularly women students. We no longer have the cheese soufflés, stuffed baked potatoes, filled baking-powder biscuits, cold plates of fruit salad and assorted sandwiches, and the other types of food, time-consuming in preparation, which appeal to young women. The quantities are comparable to those once served football players.

The Navy Ration as allowed by law, Act of March 2, 1933 (47 stat. 1423) must be followed in menu planning. We send copies of menus one week in advance to the Naval Administration Office. The skeleton menu is as follows:

Breakfast shall consist of not less than four parts as follows: fruit or cereals with milk; pancakes or waffles with syrup and sausage, or two eggs with bacon or ham; bread and butter; beverage.

Dinner shall consist of not less than six parts as follows: soup; meat or fish; two vegetables; bread and butter; dessert; beverage.

Supper shall consist of not less than five parts as follows: meat or fish; two vegetables; bread and butter; beverage; dessert.

At every meal we are inspected by the Officer of the Day, who incidentally has his 3 meals (free) in the mess hall. The Naval Administration Office furnishes him with a copy of the day's menu and he checks it for quantity and quality. Occasionally the Navy's Medical Officer, too, comes in for meals and sends in a report.

Two residence halls, completed in 1940 and designed to house 159 students each, had to be considerably rearranged to allow space and equipment for 550 to 620 persons (employees included) in each building.

A shortage of equipment necessitated certain limitations in menu planning. Not until February 1943 did we receive all equipment such as steamers, steam-jacketed kettles, two-tank dishwashing machines and a vegetable peeler ordered in July 1942. As a result the space for surface cooking had to be carefully scheduled.

Meat is served 3 times daily. To date (March 25) we have been able to get meat but not always as ordered. Boned and rolled hams are not the size ordered, for instance; the 1150 rib veal chops, each 7 ounces, will not be uniform. Our order for beef roast calls for 12-pound uniform pieces but those we receive will weigh anywhere from 3 to 20 pounds.

Fresh fruits and vegetables are a gamble. We place our orders two days in advance with local wholesale firms. Even though representatives of the firms go to either Kansas City or St. Louis markets every night, and the desired item had been available on the previous trip, we never know whether we will receive a given product of an acceptable quality, all of which means not always desirable substitutions. Shipping schedules, too, are not dependable. The new government regulation concerning total weight of shipment prevents cars from leaving the freight yards if not adequately filled. There are also mounting troubles with trucks arriving 8 to 12 hours late because of breakdowns.

All ice cream is purchased ready to serve, either in "Dixie" cups, individually-wrapped slices or the various kinds of wrapped butterscotch and chocolate-coated bars. This not only speeds service but ensures products of desired consistency when ready to be eaten, since the ice cream is placed with the rest of the meal on the tray as each man passes the counter.

Approximately 90 per cent of the trainees and our employees select milk at every meal. Because of the small dishwashing units and insufficient refrigeration for such a large group, we arranged with the university dairy department to have milk delivered in half-pint bottles immediately before a meal and the cases of unwashed bottles picked up thereafter.

Speed at the counter during service must be considered when planning the menu. Products difficult to handle rapidly and which require constant replenishing of steam-table pans must be avoided except on Sunday when the total number served is less. As far as possible, steam-table pans 9 inches deep, capable of holding the contents of 8 to 10 number 10 cans, are used for vegetables.

As in any type of menu planning, likes and dislikes as well as the nutritional requirements must be considered. We find that the majority of the trainees, like our university men students, are not at all enthusiastic about vegetables other than raw tomatoes, cole slaw, and peas, green beans, and corn. Our efforts to popularize eggplant and acorn squash were wasted. Carrots, too, are not popular, whether raw or cooked. Pecan rolls, coffee cake, doughnuts and cinnamon rolls are less popular with this group than with the university students.

Until recently the help situation has not been too serious, due partly to the fact that there are no defense industries nearby. We have both white and Negro cooks (all women), while Negro men are employed for storeroom duties and other heavy types of work. All, of course, have to be trained on the job. University students are employed for work at the steam-table, counter, and for other assignments immediately before and after meals. None of the Navy personnel assist with food preparation and service, but some are on duty in the mess halls to direct traffic at mealtime.

Each day usually resolves itself into a struggle against all kinds of handicaps—lack of equipment, crowded conditions, faulty layout, inexperienced workers, and late deliveries or failure of some item to arrive at all, but somehow, in spite of everything, food for the 500 or more in each building is ready on time. The problems so apparent to us back of the scenes, so far are nonexistent to the Navy personnel. We have a satisfied, complimentary group of trainees. They come from large naval bases in which food is produced on a larger scale and, of course, it is less "homelike" than that we serve. One recent arrival (most of them are 18 to 20 years old) met me on the stairs and asked, "Say, is it true that they have women cooks here, and they don't have beans for breakfast?" That is the trainee's point of view.

From the administrative standpoint, residence hall menu planning and food service for large military groups in time of war can and must be effectively carried out. However, the ideal conditions that prevailed for a planned number of resident students are not possible; only by hard work and sheer determination is it possible to cope with the problems that arise under these emergency conditions.

SECURING THE COOPERATION OF RESIDENCE HALL STUDENTS

MILDRED JONES[1]

The ever-mounting problems of the Food Service Department call for resourcefulness and ingenuity on the part of the residence hall dietitian. Priorities, rationing, restrictions, increasing food prices, labor shortages and overcrowded dining rooms add burdens that the dietitian cannot carry without the full cooperation of the college administration, faculty and students.

College students, we have found, like all good citizens, will cheerfully accept the inconveniences of war. We had anticipated criticism from students about the lowering of standards of service and the limitations of our menus, and in order to encourage cooperation we presented the following plea to the Dormitory Defense Committee, formed as part of the Office of Student Defense:

You can be of immediate aid by cooperating with the Food Service Department in a campaign to promote optimum nutrition, reduce waste and keep up a high morale in our residence halls. Limitations of certain foods, rising costs and labor shortages are forcing us to make drastic changes in our menus. Foods that have never been very popular with students must be served instead of some of the more expensive ones. For example, cole slaw will appear more often and head lettuce less often. But that is only a beginning—there will be many more such substitutions. We are wondering how we can make our students accept these changes cheerfully and eat these foods even if they have never cared for them. We are aware, as is every patriotic citizen, that our first duty is to maintain or attain the best possible state of health in order to have the vitality and energy to be of real value in the war effort.

[1]Manager of Women's Residence Halls, Michigan State College, East Lansing.

Nutrition and health bear a close relationship; therefore dietitians must plan meals giving consideration first to adequate nutrition and how it can be provided on a limited budget, before much attention can be given to whims, fancies, and the personal preferences of college students. What kind of physical condition and physical appearance can be expected of our students if they satisfy their tastes and appetites with between-meal snacks of "cokes" and candy bars because they haven't cultivated a taste for the healthful vegetables and other wholesome dishes being served in the dining rooms? Can this committee help teach our students the importance of eating regularly and eating the meals served to them without complaint?

Now we have another problem, that of waste. Can you help us attack it at once? A dietitian weighed and measured the food wasted in one dining room after a meal. Her figures show that over a pound of butter, 2½ lb. bread and 3 qt. stewed tomatoes were left in the dishes. If we multiply this by 5 (we have 5 dining rooms), Michigan State College women wasted 5 pounds of butter at one meal!

We have summarized the problems and we ask you to study how they may be overcome. In other words: (1) Students must be made aware of the value of good nutrition to a state of vigorous health. (2) Simple lessons in the principles of nutrition must be taught and attention must be called to the fact that the theories of sound nutrition are practised in our dining rooms. (3) Students must forget their prejudices or dislike for certain foods. They should learn to eat and enjoy all foods. (4) A student whose complaints are motivated by whims and fancies lowers morale and certainly is not socially acceptable. How can we handle such a student? We always have one or two with us. (5) There is shameful waste of food in our dining rooms. How can we reduce or eliminate it?

In a few days thereafter a program for education in nutrition and promotion of good food habits was under way. Portable bulletin boards were provided to display nutrition education material secured from various agencies. Exceptionally attractive posters, made by the art sorority and based on ideas furnished by students and faculty in the nutrition departments, were rotated through the several buildings. A close check of food waste was made and the results published. The committee had enlisted the assistance of a large number of students on various projects. Every Tuesday became known as "Ration Day." The dietitians planned low-cost meals adequate from the standpoint of nutrition. Advanced students in nutrition calculated calories, vitamins and minerals in standard portions of each item on the menu and incorporated these figures in charts posted at the dining room door, together with the daily requirements for calories, vitamins and minerals of the average college woman.

The campus paper carried weekly items about the activities of the Dormitory Defense Committee, improving food habits, nutrition education, and reducing waste. We have no way of knowing how many students actively participated in this program, but we do know that the number was large and much enthusiasm was evident.

As a result of last spring's successes, we believe that the best way of securing cooperation from the residents is to give them an opportunity to understand the dietitian's problems and then ask their help in solving these. After all, the residence hall is the college student's home for nine months or more a year and for several years. Each student is a responsible member of a very large family. The residence hall is not just a boarding-house—a place for students to eat and sleep—it is an integral part of college to the same extent as the classroom. It has long been used as a laboratory for teaching social graces and for developing desirable personal traits. Here the dietitian, too, can make her contribution through nutrition education and the training of students in good food habits; she has a professional obligation to fulfil over and above the mere planning and serving of properly balanced meals. Let her seek the cooperation of the students and in so doing she will contribute the more to their future health and welfare.

MAINTAINING FOOD STANDARDS IN WARTIME

JANE M. PORTER[1]

Despite the handicap of food shortages, we must maintain certain standards even in these difficult times. Practical means of meeting the present situation include: reducing the number of menu items carried each day; cutting down the à la carte bill of fare; restricting the number of entrées; limiting the variety of vegetables; discontinuing the privilege of substitution by guests; serving only best-selling items; planning menus a week in advance; and placing all orders two days in advance. It is not only essential but our patriotic duty to simplify the menu. When the number of items is limited, it is possible to have fresher foods, there is less preparation expense and there are fewer leftovers, which means lower food cost. But the main advantage is that by concentrating on a few items, we will have more time to make our food service attractive—to see that the bouillon is piping hot and served with crisp Melba toast; that the roast is properly cooked and garnished with fresh water cress; that the vegetables are not overcooked and are attractively served; that the salad is well-chilled and crisp and a picture in itself; that the rolls and butter are a delicate accent to a typically American menu; that the dessert is a smooth and refreshing finale to the meal; that the coffee, while limited, is still a bit of clear, fragrant and hot beverage to enhance the sense of gustatory satisfaction.

Special attention to food and perhaps other color combinations will help to brighten our limited or restricted menus. So far as possible, we should select the service that most suitably complements each food item on the menu: linens to make an interesting background; glassware that shines and sparkles; well-burnished silver; and china appropriately chilled or heated. And even during the grim business of war it should not be forgotten that flowers, candles and other table decorations, those "non-essentials," do add a color note that lifts the spirit immensely.

Variety should be stressed if our simplified food service is to be attractive. This does not mean, necessarily, the serving of unusual foods, but rather our typically American foods in just a little different manner; hot spicy apple sauce for a meat garnish; slices of left-over hard rolls for Melba chips; more of the plentiful and dietetically good cabbage, both hot and uncooked, dressed up with almonds, parsley, orange sections, or bits of tomato. The use of frozen nectars adds variety to the appetizer list. These nectars entail no labor in preparation and they do add that unusual touch, especially the plum, boysenberry and cherry

[1] Women's City Club, Detroit.

nectars. Vary the crackers and wafers served with soup—it is no more expensive than serving the same kind day in and day out. Serve vegetable croquettes as a welcome change in luncheon combinations and as a fine addition to meatless menus. Use dough cut out of the center of doughnuts for tiny crisp balls to serve with a fruit dessert. Cakes dusted with powdered sugar or spread with honey and toasted cocoanut cut down sugar consumption.

For more dressed-up meals, serve hot bouillon in tall juice glasses. If possible, use small ramekins and individual casseroles in your daily service, thereby giving that individual touch which pleases the guest and also expedites service, ensuring the service of hot foods hot, and permitting better portion control. It is a great help to check through perhaps long-forgotten recipe files and bookshelves during these days of simplification.

Quality may, or shall I say must, go hand in hand with simplified meals. As food specialists, we have built a reputation, we have established a standard, and this standard need not be lowered as we simplify. In fact, if we spend more time doing a few things well, quality should improve (providing, of course, we can still secure superior foods to begin with). Even with our constantly increasing operating and food costs, every food offered should be above reproach—beautiful to the eye, pleasing to the imagination and satisfying to the palate. The least elaborate dishes may fulfil all these: indeed it is in the preparation, dressing, and serving of such dishes that the cook's highest art is required. Like the simple frock, the simple dish may attain the greatest perfection.

"HEALTH FOR VICTORY" IN NORFOLK

BERTHA IDE[1]

Norfolk, Virginia, is now geared to very high speed since it is one of the important war-work centers. It is crowded to the limit with war workers and Army and Navy personnel. Many new problems are constantly arising, most of them to be expected with such a sudden increase in population and activities.

Within this, as in other similar cities, there is great need for better knowledge of nutrition to help meet the physical needs of the populace. The "Health for Victory Club" is an important response to this need. This club, previously mentioned by Mrs. Julia Kiene in this JOURNAL for November 1942, was first started by Westinghouse Electric & Manufacturing Company, Mansfield, Ohio, for its own employees. Rapidly other "H for V" clubs were organized and in February 1943 the largest club in the State of Virginia was organized in Norfolk. Over 500 women attended the first of a series of 12 meetings sponsored by the Norfolk Office of Civilian Defense and the Nutrition Committee. The classes are being conducted by the Home Service Department of the local power company in its auditorium.

At the first meeting, planned as an introduction to nutrition, a menu guide for the month was distributed to each of those present. It was in the form of a booklet and contained menus for breakfast, luncheon, dinner and the lunch-box, as well as recipes, cooking instructions and vital nutrition information. A schedule of work to be followed in preparing the meals was included. Also, the cost per week for food for a family of 6 was estimated. Members were told that if the directions were accurately followed each meal would be well-balanced and nutritious. At subsequent meetings, similar monthly menu guides were distributed, providing the members with something practical and helpful to follow.

New members are continually being added to the "Health for Victory Club" in Norfolk. These women are learning that better health means better efficiency on the job and that their responsibility is to promote that better health.

[1] Chief dietitian, Norfolk General Hospital.

Nutritional Diseases

To me it appears unlikely that any significant amount of serious nutritional disease will appear in this country as a result of the war. . . . However, to attain the goal in nutrition which has been suggested will not be easy. To begin with, public interest in nutrition may lag after the war without the striking reminder of severe deficiencies. The less dramatic gain in health as nutrition approaches the optimum will not be so apparent. Continued effort at public education must be maintained, but the mistake must not be made of exaggerating nutrition. Other causes for ill health exist, and attempts to make adequate nutrition a panacea will fail as do all panaceas. . . . For the most part, however, the postwar problems will be problems of opportunity. There will be required, first of all, a much greater production of food. There is every reason to believe that this will exist at the end of the war. Much of this increased production may be needed in the early postwar period for supplying those populations whose production and supplies have been deficient. With peace, however, production should be increased in those regions also and cooperative effort for this purpose is already planned by the United Nations. All this increase will be needed, however, if the goals of nutrition which have been set are reached. It has been estimated that even in this country it would be necessary to increase production of the more expensive foods 15 to 100 per cent to raise the dietary level of the poorest to standards of those who are even moderately well fed. If this applies throughout the world, the effect on world trade, commerce and industry is obvious.

In addition to the production of increased amounts of food there is the problem of increasing the nutritive qualities of foods. . . . Despite a great increase in production, however, there remains the problem of distribution. Not distribution in the physical sense of transport but equitable distribution among all classes of the population based on need. . . . There remains to be considered the problem of individual nutrition, the study of which will remain the principal source of fundamental advance in this field. . . . Similarly the relation of nutritive factors to the intimate details of metabolic and detoxification mechanisms are of particular importance in relation to various occupational exposures and the course and outcome of other disease.—*Youmans, J. B.: Nutritional Diseases as a Postwar Problem. J. A. M. A., 122: 11, 1943.*

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MEDICAL DEPARTMENT DIETITIANS APPOINTED IN JUNE 1943

NAME	SCHOOL	TRAINING COURSE	STATION ASSIGNED
Bacon, Cathryn Jean	Iowa State Col.	Lincoln G. H., Neb.	Bruns G.H., Santa Fe, N. M.
Beatty, Vivian Louise	Univ. of Cincinnati	Henry Ford Hosp.	W.R.G.H., Washington
Birkland, Beryl Geneva	Iowa State Col.	Miami Valley Hosp.	S.H. Ft. Leonard Wood, Mo.
Blackmore, Mary Ford	Indiana Univ.	Indiana Univ. Med. Cen.	S.H. Peterson Fld., Colo.
Boyd, Ruth	Drexel Inst. of Tech.		Letterman G.H., San Francisco
Boyd, Ruth Ann	St. Mary's Col., Kan.	Good Samaritan Hosp., Cincinnati	S.H. La Junta AAF, Colo.
Brosius, Julia Lembkey	Mich. State Col.	Harper Hosp.	Overseas
Campbell, Mary Cathaleen	Framingham S.T.C.		S.H. Fort Niagara, N. Y.
Carlin, Virginia Rudy	Univ. of Kentucky	Barnes Hosp., St. Louis	Nichols G.H., Louisville
Chapman, Emma	Tex. Tech. Col.	Presbyterian Hosp., N. Y.	S.H. Ogden Air Depot, Utah
Cleary, Kathleen Patrician	Col. of St. Catherine, St. Paul	Ancker Hosp.	S.H. Eglin Fld., Valparaiso, Fla.
Coe, Virginia Nutt	Ohio Univ.	Shadyside Hosp.	S.H. AAF Regional Hosp., Palm Beach
Curley, Alice Clare	Marywood Col., Penn.		New Orleans Port of Embarkation
Davis, Betty Lou	Univ. of Maine		S.H. Cp. Shelby, Miss.
Doak, Almeda Emma	Univ. of Okla.	Grasslands Hosp., N. Y.	S.H. Cp. Maxey, Tex.
Fein, Beverly Rebecca	Univ. of Conn.	Montefiore Hosp., N. Y.	S.H. Avon Park Bombing Range, Fla.
Fitzpatrick, Olga Helen	Univ. of Calif.	Alameda Co. Hosp., Calif.	S.H. San Francisco Port of Embarkation
Fogg, Dorothy Elizabeth	Skidmore Col.	Beth Israel Hosp., Boston	S.H. Ft. Devens, Mass.
George, Helen Elizabeth	Alabama Col.		S.H. Cp. McCain, Miss.
Godden, Mary Elizabeth	Univ. of Iowa	Harper Hosp.	Torney G.H., Palm Springs, Calif.
Goodman, Elizabeth	Univ. of Calif.	Univ. of Iowa Hosp.	Overseas
Haley, Iola Louise	Oregon State Col.	Mass. G.H.	Kennedy G.H., Memphis
Harper, Jessie Audrey	Oregon State Col.	Montefiore Hosp., N. Y.	S.H. Cp. Adair, Calif.
Hawkins, Jean Marguerite	Univ. of N. D.	Ancker Hosp.	W.R.G.H.
Holt, Gertrude Anna	Okla. A. & M. Col.	Univ. of Minn.	S.H. Jefferson Bks., Mo.
Hopkins, Nancy Olivia	Univ. of Alabama	Michael Reese Hosp.	S.H. Cp. Gordon, Ga.
Hurka, Eleanor Mae	Univ. of Iowa	Duke Univ. Hosp.	Overseas
Kane, Elizabeth Ann	Mt. Mary Col., Wisc.	Good Samaritan Hosp.	S.H. Sioux City AAB, Iowa
Kendall, Alice Eleanor	Univ. of Ill.	Michael Reese Hosp.	S.H. Cp. Myles Standish, Mass.
Kinnamon, Jane Frances	Univ. of Kan.	Harper Hosp.	Hammond G.H., Modesto, Calif.
Klaumann, Doris Charlotte	Kan. State Col.	Christ Hosp., Cincinnati	Halloran G.H., Staten Island, N. Y.
Knapp, Hannah Elizabeth	Miami Univ.	Christ Hosp.	Overseas
LaBerge, Annette Marie	Univ. of Minn.	Henry Ford Hosp.	W.R.G.H.
Lewis, Constance Evangeline	Carnegie Inst. of Tech.	Harper Hosp.	S.H. Cp. Murphy, Fla.
McIntyre, Ethel Mae	Oregon State Col.		S.H. Pendleton Fld. AAB, Ore.
McLernon, Frances Merrill	Nasson Col., Me.		S.H. Ft. Devens, Mass.
Makivirta, Soini Linnea	Univ. of Minn.	St. Mary's Hosp.	S.H. Cp. McCoy, Wisc.
Manford, Edith Kemper	Fla. S.C. for Women	Indiana Univ. Med. Cen.	S.H. Ft. Bragg, N. C.
Marsh, Frances La Vonne	Univ. of Ill.	Harper Hosp.	S.H. Cp. Beale, Calif.
Miller, Mary Margaret	Fla. S.C. for Women	Harper Hosp.	Overseas
Moles, Marie Lolita	Clarke Col.	Cook County Hosp.	S.H. Cp. Grant, Ill.
Morris, May	Iowa State Col.	Minneapolis G.H.	S.H. Cp. Fannin, Tex.
Perkins, Helen Catherine	Kan. State Col.	Harper Hosp.	S.H. Ft. Lewis, Wash.
Ragsdale, Eloise	Univ. of Tenn.	Mass. G.H.	Kennedy G.H.
Reichman, Alice Beatrice	Univ. of Vermont	N. J. Coop. Course	Halloran G.H.
Rowe, Mildred Lois	Univ. of Idaho	Christ Hosp.	S.H. Victorville AAF, Calif.
Rudisill, Helen Pauline	Woman's Col. Univ. of N. C.	Indiana Univ. Med. Cen.	S.H. Cp. Hood, Tex.
Sarry, Carmela Marie	Marywood Col.		S.H. Shenango Personnel Replacement Depot, Penn.
Schumaker, Lois Mary	Iowa State Col.	Mercy Hosp., Chicago	Overseas
Sekerak, Betty Jane	Iowa State Col.	Montefiore Hosp., N. Y.	S.H. March Fld., Calif.
Sellers, Merle Martha	Tex. Tech. Col.	Fla. S.C. for Women	S.H. Ft. Bliss, Tex.
Slocum, Laviana Laurie	Madison Col.	Med. Col. of Va.	S.H. Ft. Bragg, N. C.
Strom, Mary Louise	Univ. of Mont.	Univ. of Minn. Hosp.	S.H. Cp. Barkeley, Tex.
Taft, Martha Scott	Drexel Inst. of Tech.	Univ. of Tex. Admin. Course	Overseas
Taylor, Dorothy Elizabeth	Univ. of Calif.	Latter-Day Saints Hosp.	S.H. Cp. Irvin, Barston, Calif.
Unash, Florence Wilhelmena	Univ. of Iowa	Univ. of Iowa Hosp.	S.H. Cp. Ellis, Lewiston, Ill.
Weinman, Helen Virginia	Ohio State Univ.		Deshon G.H., Butler, Penn.
Wides, Ida	New York Univ.	Montefiore Hosp., N. Y.	S.H. Cp. Blanding, Fla.
Wiegand, Frances Mary	N. J. Col. for Women	Grasslands Hosp.	S.H. Shenango Personnel Replacement Depot, Penn.
Willis, Mildred Thomas	Winthrop Col.	Montefiore Hosp., N. Y.	S.H. Cp. McCain, Miss.

Note: All those for whom the name of training courses is not listed have had qualified hospital experience.

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Current Literature

Contributed by Helen Baughman, Janet Engebretsen and Hilda McEwen, Dietary Department, Johns Hopkins Hospital, Baltimore; Quindara Oliver Dodge, School of Home Economics, Simmons College, and Women's Educational and Industrial Union, Boston; and the Journal Staff.

AMERICAN JOURNAL OF DIGESTIVE DISEASES

Vol. 10, May 1943

*The absorption of vitamin A in chronic ulcerative colitis. R. C. Page and Z. Bercovitz.—p. 174.

*The diet in diabetes mellitus. W. S. Cutting and G. B. Robson.—p. 177.

*Constipation: Clinical and roentgenological evaluation of the use of bran. M. H. Streicher and L. Quirk.—p. 179.

Absorption of Vitamin A in Colitis. In vitamin A absorption tests consisting of oral administration of 100,000 U. S. P. units to 25 patients with chronic ulcerative colitis, 9 with miscellaneous diseases of the gastro-intestinal tract and 8 healthy normal adults, the plasma vitamin A level did not rise so high in those with chronic ulcerative colitis as in the control subjects. This difference can best be explained by decreased absorption due to a reflex mechanism operating from the damaged colon that inhibits absorption from the small intestine. An additional factor, diarrhea, is often present.

Diet in Diabetes. Most diabetics require a quantitative diet, but this need not differ greatly from that of normal persons. Highly concentrated carbohydrate foods are inadvisable since a slight error in calculation may make a great difference in total content and because such foods would necessarily displace others richer in vitamins and minerals. The use of a few standard diet forms, with inherent flexibility to allow adequate choice of individual foods, makes diet prescribing simple for most physicians. Actual examples of 4 such diets in practical use are presented in an addendum.

Bran in Constipation. Of 135 patients studied, 107 were improved clinically, 26 remained unchanged and 2 became worse. Of 135 patients studied roentgenologically, 31 demonstrated delayed cecal emptying time before bran, 16 showed delayed motility while on bran, and 15 were improved while on bran. Of 90 patients showing delayed total emptying time before bran, 63 were recorded with delayed motility while on bran, showing that 27 were improved. Bran administered orally aids bowel activity.

AMERICAN JOURNAL OF DISEASES OF CHILDREN

Vol. 65, May 1943

*Nutrition as a conditioning factor in the rheumatic state. A. F. Coburn and L. V. Moore.—p. 744.

Nutrition and Rheumatic Fever. Environmental influences associated with unhygienic living have been considered important in the development of rheumatic fever. At Pelham Home, New York, re-enforced diets were tested on rheumatic children. Between 1939 and 1941, dietary intakes of 100 normal and 50 rheumatic children were determined. The rheumatic group was divided equally: one, the less susceptible; the other, the more susceptible. The more susceptible group consumed less protein, calcium, phosphorus, iron, vitamin A, thiamin and riboflavin, than either the less susceptible or the normal groups. The daily addition of 2 whole eggs plus 2 frozen egg yolks to the regular diet prevented further rheumatic attacks. Highly susceptible rheumatic children consumed diets low not only in one but in all factors, proving that poor diets condition humans to rheumatic fever.

AMERICAN JOURNAL OF MEDICAL SCIENCES

Vol. 205, May 1943

*A new test of liver function—the tyrosine tolerance test. F. W. Bernhart and R. W. Schneider.—p. 636.

Tyrosine Test of Liver Function. In the presence of liver disease, tyrosine is improperly metabolized. A quantitative method of blood tyrosine tolerance on 10 normal subjects revealed that 3 hours after 4 gm. tyrosine was administered, an average concentration of 3.4 mg. per 100 cc. was found in the blood, as compared with as much as 11 mg. per 100 cc. in the blood of patients with liver disease. Advantages of the test are that it is more sensitive than other tests, appears reliable, economical, safe and well-tolerated; it may prove valuable as a test of liver function as well as of liver damage.

AMERICAN JOURNAL OF PHYSIOLOGY

Vol. 139, May 1943

*Pattern of normal water drinking in dogs. E. A. Robinson and E. F. Adolph.—p. 39.

*Dietary "self-selection" and appetites of untreated and treated adrenalectomized rats. W. G. Clark and D. F. Clausen.—p. 70.

*The effect of experimental thyroid abnormalities on appetite. J. Warkentin, L. Warkentin and A. C. Ivy.—p. 139.

*Depressive effects produced on appetite and activity of rats by an exclusive diet of yellow or white corn and their correction by cod liver oil. C. P. Richter and K. K. Rice.—p. 147.

Normal Water Drinking. Conditions of water loss and of food gain were varied while spontaneous drinking was observed in dogs. The signal that initiates water drinking ordinarily appears to be a deficit of water relative to other bodily components. Whenever the body is depleted of water by about 0.5% of the body weight, water is drunk, the amount being accurately proportioned to the body's water deficit at each draft, though no absorption of water has time to occur before drinking ceases. Body weight is only a rough criterion of water balance since addition of food and loss of katabolic products complicate its relations.

Dietary Choice and Appetite of Adrenalectomized Rats. In self-selection experiments on such rats to determine if voluntary intake of any of the dietary constituents was altered, Richter's observation of increased voluntary selection and beneficial effect of NaCl, reversed by adrenal cortical hormone therapy, was confirmed. No effect of adrenalectomy was observed on the intake of protein, carbohydrate, fat, yeast, or solid salt mixture. An exceptional experiment was described which showed a decreased sugar intake after adrenalectomy but the rats lost weight and several died.

Thyroid Abnormalities and Appetite. In 6 rats made hypothyroid, 6 others made hyperthyroid, and 6 normal controls, the thyroidectomized rats showed a markedly greater decrease in food intake than did the normals, while the hyperthyroid ate much more food than either of the other groups. No characteristic qualitative differences in food selection were noted due to thyroid abnormalities.

Yellow or White Corn Diet. In white corn there is almost certainly a deficiency of vitamin A, as well as of the factor lacking in yellow corn, both of which are corrected by a cod liver oil supplement. Evidence indicates that yellow corn contains some factor lacking in white corn and not present in cod liver oil.

ARCHIVES OF INTERNAL MEDICINE

Vol. 71, May 1943

*Serum concentration and renal clearance of potassium in severe renal insufficiency in man. N. M. Keith, H. E. King and A. E. Osterberg.—p. 675.

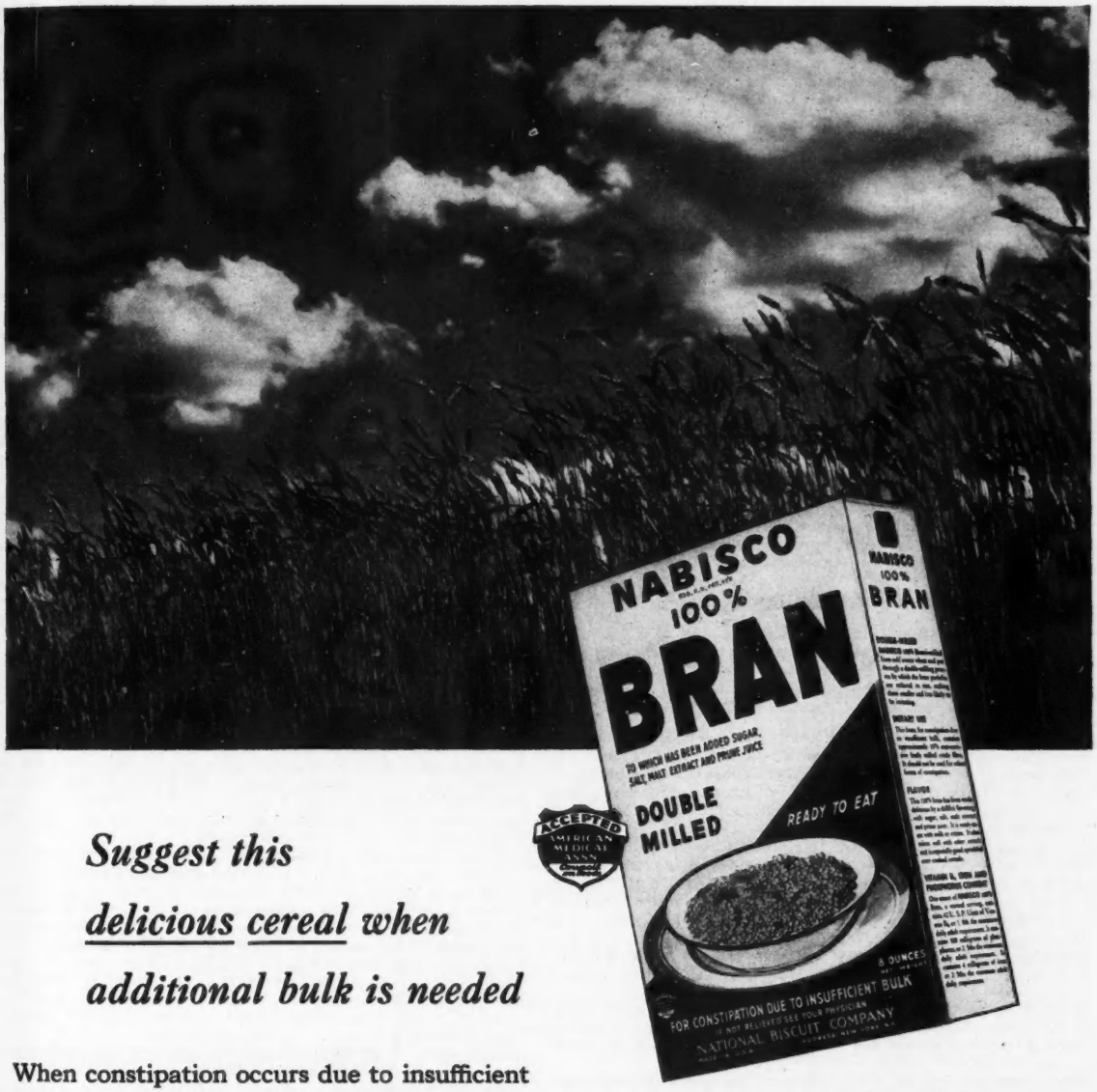
Potassium Concentration and Clearance. Disturbances of potassium excretion are often difficult to demonstrate in renal disease. Potassium is more slowly excreted into the urine and blood concentration may be twice normal value in severe renal dysfunction. Dehydration, excessive tissue katabolism and the volume of distribution of potassium throughout body fluids and cells all cause potassium retention in renal insufficiency. A sustained increase of serum potassium in renal disease should forbid the therapeutic use of a potassium salt.

ARCHIVES OF PEDIATRICS

Vol. 60, May 1943

*The fat youngster—guiding principles in treatment of 200 cases of alimentary obesity in patients under age 15. I. Bram.—p. 239.

The Fat Youngster. About 95% of cases of juvenile obesity are of alimentary type, due to overeating as a result of unbridled appetite and parental indulgence. The average fat



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youngster is easily amenable to careful treatment, consisting of dietetic, medicinal and psychotherapeutic measures. Results are satisfactory and permanent in direct proportion to the cooperative spirit created by wise psychotherapeutic efforts. When normal weight is reached, the patient must be followed up in person at regular intervals for 3 to 5 years to safeguard against recurrence of overweight.

BULLETIN OF THE JOHNS HOPKINS HOSPITAL

Vol. 72, May 1943

*Studies in experimental hypertension. II. The effect of dietary protein on the urea clearance and arterial blood pressure in chronic hypertension. L. K. Alpert and C. B. Thomas.—p. 274.

*Studies in experimental hypertension. III. The effect of dietary protein on the clearances of diodrast and insulin by the kidney in chronic hypertension. L. K. Alpert and J. L. Lilienthal, Jr.—p. 286.

Protein Influence on Urea Clearance. Determinations of the urea clearance during periods of varying intake were made in 5 dogs—4 hypertensive, 1 normal. During periods of low-protein intake, urea clearance was normal, but showed pronounced elevations if high-protein diets were fed. Variations of arterial pressure could not be correlated with changes in protein intake or urea clearance.

Protein Influence on Diodrast and Insulin Clearances. In 6 dogs studied, 4 had chronic hypertension and 2 were normal. Insulin, diodrast and urea clearance values were higher during periods of high protein intake than during the low ones. It was concluded that blood flow and functional activities of hypertensive dogs may be unimpaired, and react normally to the stimulus of increased dietary protein.

ENDOCRINOLOGY

Vol. 32, May 1943

*Effect of high protein diets on size and activity of the adrenal cortex in the albino rat. J. Tepperman, F. L. Engel and C. N. H. Long.—p. 403.

*Effect of diet on adrenal weights and on survival following adrenalectomy. D. J. Ingle, G. B. Ginther and J. Nezamis.—p. 410.

Adrenal Cortex and High-Protein Diet. On the basis of a survey of literature and experimental data on animals receiving high-protein diets, it is suggested that some event or series of events occurring during katabolism of protein may serve as a stimulus for hypertrophy of adrenal cortex observed in a variety of circumstances.

Adrenal Weight and Diet. In a study of the effect of different proportions of carbohydrate, protein and fat in the diet on weights of adrenal glands of rats and on periods of survival following adrenalectomy, the differences observed were small and probably without significance.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 122, June 12, 1943

*Excretion of thiamine, riboflavin, niacin and pantothenic acid in human sweat. T. Cornbleet, E. R. Kirch and O. Bergeim.—p. 426.

*Renal glycosuria in selectees and volunteers. H. Blotner and R. W. Hyde. —p. 432.

*The handbook of nutrition: XVII. Improving the quality of cheap staple foods. G. R. Cowgill.—p. 437.

*Hypervitaminotic gallstones. Current comment.—p. 444.

Vol. 122, June 19, 1943

*Handbook of nutrition: XXVI. Principles of diet in the treatment of disease. T. D. Spies.—p. 497.

Vitamin Excretion in Sweat. The excretion of vitamins in sweat is of interest from the standpoint of the metabolism of such vitamins in the body and the possible loss of such vitamins by this channel, especially in instances of profuse sweating. Heat sweat (per liter) was found to contain on the average about 150 mcg. thiamin, 120 mcg. riboflavin, 300 mcg. pantothenic acid and 200 mcg. nicotinic acid, corresponding for thiamin to about 5% of intake on a good diet, for rioboflavin and pantothenic acid to about 3% and for nicotinic acid to about 0.5%. For average American diets the percentages would be more nearly 10% for thiamin, 5% for riboflavin and 1% for nicotinic acid. The excretion of such amounts of these vitamins cannot be said to be negligible from the physiologic standpoint although perhaps becoming of real importance only in case of rather profuse sweating or on diets low in these vitamins. The losses of the other vitamins are of the same order as losses reported for ascorbic acid in sweat. Since favorable results have been reported in the administration of ascorbic acid in cases of profuse perspiration, it is possible that supplements of other vitamins might be worthy of trial under similar conditions.

Glycosuria. In a study of glycosuria in 45,650 consecutive selectees and volunteers aged 18 to 45 years, the incidence of glycosuria was 0.8%, or 367 cases, classified as 208 cases of diabetes mellitus, 126 of transient glycosuria and 33 of renal glycosuria. The observations strongly suggest that renal glycosuria is a symptomless, not uncommon, clinical entity which may follow a definite pattern as to age and weight and merits more extensive study.

Staple Foods. Current standards for enrichment or fortification of grains and other foods are given. The author believes that if there are reasonable grounds for believing that a serious deficiency of the dietary factor of interest does exist, the question then arises as to the most suitable food to be "enriched" or fortified with it. Macaroni which is always boiled when being prepared for the table is cited in illustration. Tests have shown that boiling results in loss of roughly 50% of added vitamin B_1. Therefore, even if the pure vitamin can be obtained at practically negligible cost, so that relatively large amounts more than sufficient to offset such loss can be added, one may well question the practicality of its addition to macaroni. Another example is the fortification of lard with vitamin A. Since this animal fat is widely used in cooking and such use results in appreciable loss of the vitamin, a conservative attitude toward the question of the addition of vitamin A to lard is justified. "In the light of these two illustrations it is obvious that a body of facts regarding the need for various dietary essentials and the probable supply in common foods is required, as well as information of the technological sort concerning the feasibility of the proposed addition to any given food product before approval should be given any specific proposal of enrichment or fortification." The views of the Council on Foods and Nutrition of the A.M.A. and the Committee on Food and Nutrition of the National Research Council on this question are stated, from which it may be assumed that the idea of adding vitamins and minerals, or other dietary essentials, to foods has been accepted sufficiently to secure official sanction in the following cases: the appropriate enrichment of flour and bread (and perhaps other cereal products) with several factors; the fortification of milk with vitamin D, of table fats with vitamin A, and of table salt with iodine. "To what extent other additions will finally acquire widespread acceptance and then official approval, only time and the accumulation of new data can determine."

Hypervitaminotic Gallstones. A supplementary daily administration of 25 mcg. riboflavin, 125 mcg. calcium pantothenate, or both, increased the apparent well-being of both control and cholesterol fed animals, but the guinea-pigs fed cholesterol and given supplementary vitamin B showed an abrupt and usually fatal anemia without the usual preliminary loss of weight or other signs of illness; 80% of the necropsies in these fatal cases revealed gallstones (often impacted) accompanied by irritating lesions of the gallbladder and biliary passages, and 15% of the fatal cases showed "murky" bile but without macroscopic gallstones. All control guinea-pigs of the series of animals not given the vitamin B supplement but fed cholesterol were free from gallstones. The conclusion seems inevitable that an overabundance of vitamin B will lead to gallstone formation in animals otherwise tolerant to cholesterol-rich diets. The editorial writer comments that with the recent demonstration of the deleterious effects of excessive doses of thiamin on natural resistance to experimental poliomyelitis, these observations are of basic clinical interest. These vitaminogenic gallstones showed that they were rich in calcium phosphate although containing some cholesterol.

Principles of Diet. The diagnosis of clinical conditions and the assessment of the nutritional status of a patient and his family can best be made by a conservative interpretation of the data from a dietary and food survey, a complete medical history and physical examination, and special laboratory determinations. It is of primary importance to obtain a nutrition history when the patient is first seen. A sample form for use in recording history is included which although not allowing an accurate calculation of the various nutrients in the dietary, "has the advantage of not requiring a great deal of time or special training on the part of the persons taking or evaluating the data." Frequently, trained observers keep an accurate record of the patient's food intake for a period of a week or more at various seasons of the year. From this the nutritive value of the dietary is evaluated and the degree of deficiency of his diet is correlated with clinical findings and

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laboratory tests. Such a method is practical only if the patient is sufficiently intelligent and cooperative to keep an accurate record of his food intake and if the time and services of a trained nutritionist are available to supervise the collection and summarization of the data and to calculate the nutritive value of the dietaries. A list of symptoms occurring in persons "known to have ingested inadequate amounts of required nutrients" is included, also special laboratory tests of use in diagnosis. Four groups prone to deficiencies of the essential nutrients are: (1) Those who are indigent and have erroneous dietary habits or dietary idiosyncrasies. (2) Persons with organic disease. (3) Those for whom "the overzealous physician" prescribes a diet so deficient that nutritive failure is gradually induced. "We suggest that the physician prescribing special therapeutic diets check the food recommended with that which he knows is required for the adequate diet." (4) Persons with chronic alcoholic addiction.

Therapy should be directed along four lines. Conditions causing excessive requirements for nutritional essentials should be removed or relieved wherever possible. Substances should be administered in sufficient amounts to correct the deficiency. Symptomatic treatment and treatment for coexisting diseases should be given. A liberal and well-balanced diet should be prescribed. Dr. Spies states that "Our clinical experience and controlled studies have led us to adopt a policy of mixed vitamin therapy in treating nutritional deficiencies. . . . It is better to prescribe too much than too little, too soon rather than too late." The author reports his own methods only. No references to the literature are included.

JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 148, May 1943

*Comparison of the lipotropic effects of choline, inositol, and lipocaic in rats. G. Gavin, J. M. Patterson and E. W. McHenry.—p. 275.

*Observations on tryptophane deficiency in rats. Chemical and morphological changes in the blood. A. A. Albanese, L. E. Holt, Jr., C. N. Kajdi and J. E. Frankston.—p. 299.

*The excretion of ascorbic acid, thiamine, riboflavin, and pantothenic acid in sweat. D. M. Tennent and R. H. Silber.—p. 359.

*The relation of the diet to the composition of tissue phospholipids. III. Effects of supplemented experimental diets on tissue phospholipids in rats of two age groups. C. Artom and W. H. Fishman.—p. 423.

*Spectrophotometric studies of the storage of vitamin A in the body. R. W. Little, A. W. Thomas and H. C. Sherman.—p. 441.

Effect of Lipotropic Agents. A comparison of lipotropic effects of choline, lipocaic, and inositol upon various diet-induced types of fatty livers in rats, showed choline effective for thiamin fatty livers, partially effective for cholesterol fatty livers, but having little activity upon biotin fatty livers. Against this last type both inositol and lipocaic are active. Lipocaic apparently differs from inositol in being ineffective against fatty livers caused by feeding cholesterol with a high-fat diet. Inositol shows no activity with thiamin fatty livers; the addition of other B-vitamins permits inositol to be lipotropic.

Tryptophane Deficiency. Plasma proteins as well as hemoglobin are higher in adult than in young rats. A low-caloric intake, sufficient to inhibit growth, causes no reduction in the concentration of plasma proteins or of hemoglobin. A diet deficient in tryptophane brings about a reduction in plasma proteins and in hemoglobin. Reduction in plasma protein precedes that of hemoglobin. Addition of a tryptophane supplement restores plasma proteins and hemoglobin to normal level.

Vitamin Excretion in Sweat. Ascorbic acid, thiamin, riboflavin, and pantothenic acid have been determined in thermal sweat and in sweat induced by exercise of human subjects, with and without preceding administration of vitamins. Amounts of thiamin excreted were insignificant. No ascorbic acid was found, but dehydroascorbic acid was excreted to the extent of about 0.2 mg. per hour. The average riboflavin excretion was 10 μ per hour whether the subjects had been dosed or not. The average excretion of pantothenic acid was 24 μ per hour for non-dosed subjects and 50 μ per hour for those who were.

Diet and Phospholipids. In rats 2 to 3 months old, supplementation of an experimental diet with choline hydrochloride, ethanolamine, dl-serine, glycine, l-cystine, or dl-methionine in amounts adequate to prevent the fatty infiltration of the liver, did not raise the low values of choline-containing phospholipids observed in the liver of animals on unsupplemented diet. In the liver of newly weaned rats, as in older rats, concentration of choline phospholipids was lowered by experimental diet, but the effect was completely prevented in the newly weaned and not in the older rats by supplementing the diet with choline.

Vitamin A. In striking degree, the higher levels of nutritional intake support higher levels of concentration of vitamin A in the liver, and enable the body to continue thus to increase its store of this vitamin to higher ages.

JOURNAL OF NUTRITION

Vol. 25, May 10, 1943

*Ascorbic acid nutrition of some college students. A. P. Brown, M. L. Fincke, J. E. Richardson, E. N. Todhunter and E. Woods.—p. 411.

*Increased resistance to ulcerative cecitis of rats on a diet deficient in the vitamin B complex. A. L. Bloomfield and W. Lew.—p. 427.

*The biological determination of vitamin E. H. Gottlieb, F. W. Quackenbush and H. Steenbock.—p. 433.

*The choline content of animal and plant products. R. W. Engel.—p. 441.

*On the linear arrangement of palatability of natural foods with an example of varietal preference in Leguminosae and Cruciferae by a new, rapid laboratory method. W. F. Dove.—p. 447.

*The value of dairy products in nutrition. III. The riboflavin, pantothenic acid, nicotinic acid and biotin content of several varieties of cheese. R. A. Sullivan, E. Bloom and J. Jarmol.—p. 463.

*The effect of aromatic hydrocarbons on growth. The reversible inhibition of pantothenic acid by sulfapyridine. H. D. West, N. C. Jefferson and R. E. Rivera.—p. 471.

*The effect of dietary fat on bone calcification in the growing rat. R. Bunkfeldt and H. Steenbock.—p. 479.

*Ascorbic acid deficiency among Papago Indians. M. Pijoan, C. A. Elkin and C. O. Eslinger.—p. 491.

Growth in mice fed diets rendered deficient in cystine, but not in methionine. C. D. Bauer and C. P. Berg.—p. 497.

*The influence of variety, size, and degree of ripeness upon the ascorbic acid content of peaches. G. M. Schroder, G. H. Satterfield and A. D. Holmes.—p. 503.

Ascorbic Acid Nutrition. In college students 23.8% of the women and 7.3% of the men had plasma levels of 1.0 mg. ascorbic acid per 100 ml. or more; 26.3% of the women and 16.4% of the men had values between 0.8 and 0.99 mg.; 42.3% of the women and 49.4% of the men were in the group from 0.4 to 0.79 mg., and 7.6% of the women and 26.9% of the men in the lowest group had less than 0.4 mg. per 100 ml. The mean plasma value for the men was significantly lower than that for the women. Women eating in cooperative houses had a higher mean ascorbic acid plasma value than any of the other groups; those eating at home or in boarding houses had a mean value higher than those in dormitories or in bachelor quarters. The men eating at home or in boarding houses had ascorbic acid values significantly higher than the mean for all men. No correlation was found between plasma ascorbic acid levels and height, weight, or age.

Deficient Diet and Rat Cecitis. Rats on a diet deficient in vitamin B complex over a period of months failed to develop "spontaneous ulcerative cecitis" except, very mildly, in an occasional animal. One-half of the litter-mate controls had the disease, for the most part in well-advanced form. This is an example of increased resistance to infection, rather than increased susceptibility, brought about by undernutrition and vitamin deficiency.

Vitamin E Assay. A new low-fat diet is satisfactory for vitamin E assays, and new criterion, the increase in weight during gestation, is valid as a basis for determination of vitamin E. The new method was more sensitive and more economical than other methods. For an equal response the requirement for vitamin E on the low-fat diet was less than half that on a high-fat diet.

Choline in Animal and Plant Products. Animal organs, egg yolk, and nerve tissue were found to be better sources of choline than any of the plant material examined. Green leafy plant material compared favorably with muscle tissue. Good sources of choline in plant material were green leafy and leguminous vegetables, seed oil meals and grain germs. Seed oil meals were found to be equal or superior to the whole seeds as sources of choline. Skim milk powder contained nearly a third more choline than whole milk powder.

Linear Order in Food Preference. Foods may be arranged in linear order in terms of palatability ratings. The "substitution test" devised for this purpose allows necessary freedom for natural expression of nutritional behavior and yet permits controlled repetition of the experiment. There was some evidence that palatability ratings rose with increased

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moisture content and fell with increased fiber content. In order to facilitate comparison of palatability ratings with nutritional value, a series of Taste Tester Varieties was devised as a preliminary standard for future comparison.

Vitamins in Cheese. When 12 different types of cheese were analyzed for riboflavin, pantothenic acid, nicotinic acid and biotin, only minor variations were observed for riboflavin, but the other factors appeared to be dependent upon the age of cheese and ripening process by which it was produced.

Pantothenic Acid and Sulfapyridine. A synthetic diet low in casein containing sulfapyridine alone or together with l-cystine or dl-methionine induces symptoms, chiefly those of pantothenic acid deficiency, which are reversed by supplementation with calcium pantothenate. Sulfapyridine directly retards growth rate of rats on a low-casein diet, the condition being relieved by either l-cystine or dl-methionine. By inhibiting pantothenic acid an additional indirect effect on slowing the growth rate by the drug is produced.

Fat on Calcification. When cottonseed oil was included in a low-phosphorus, cereal-free rachitogenic ration for rats, calcification was decreased uniformly and in proportion to the amount of oil fed and paralleled the greater increments in weight produced by the fat rations as compared with the basal. When cottonseed oil was included in a diet "optimal" in phosphorus content, calcification was increased to a pronounced degree; when it was included in a diet containing more than "optimal" phosphorus, it was likewise increased though to a lesser degree.

Ascorbic Acid Deficiency. Among Papago Indians there is an obvious insufficiency of ascorbic acid in the diet. The plasma levels were not those characteristic of scurvy, rather the beginning of "subclinical" scurvy. The body economy of these people is poor and the numerous deficiencies form vicious circles involving infections. Introduction of synthetic vitamin preparations or foods foreign to their culture has been attempted but their use is of short duration since such preparations have no cultural significance and medical results are slow and undramatic. No plants having a high ascorbic acid content are found on the Papago reservation.

Ascorbic Acid in Peaches. There was no correlation between the size of the peach and its ascorbic acid content. Hard peaches contained a minimum amount, increasing to a maximum in the fully ripe, edible peach, the average ascorbic acid content of which varied from 3.84 to 12.86 mg. per 100 gm. The ascorbic acid content of peaches is not so high as that of lemons, oranges, or tomatoes, but fully ripe peaches contain sufficient to contribute materially to human requirements.

PUBLIC HEALTH REPORTS

Vol. 58, May 21, 1943

*National, provincial, and local nutrition programs in Canada. G. F. Amyot. —p. 793.

A cooperative nutrition program in North Carolina. J. F. Kendrick.—p. 707.

*The role of the health department in the national nutrition program. W. H. Sebrell and W. Wilkins.—p. 803.

Nutrition Programs in Canada. A nutrition survey showed 40% of the population to be on the borderline, 40% not receiving sufficient to meet accepted standards and only 20% receiving food adequate for normal requirements. Subsequently, a National Nutrition Service with a physician director, an assistant nutritionist and three field workers was set up. Stress was placed on war industries, educational material of broad scope, school lunch programs, victory gardens, food production, conservation, preservation, preparation and serving. Two nutrition committees in British Columbia, one technical and advisory and the other nontechnical, aim at interesting all people in the effective use of food.

Role of Health Department in Nutrition Program. This comprehensive article shows the need and place of applied nutrition in a public health department, with suggestions for developing such a service.

SOUTHERN MEDICAL JOURNAL

Vol. 36, May 1943

*Alcohol and cirrhosis of the liver. R. S. Boles.—p. 353.

*Medical and nutritional survey of 800 N. Y. A. youths: Experience at National Youth Administration work center in rehabilitation of youths of draft age. I. H. Manning, Jr. and D. F. Milam.—p. 373.

Alcohol and Liver Cirrhosis. Abundant experimental, clinical and pathologic evidence indicates that alcohol, contrary to prevailing opinion, cannot seriously be regarded as a specific cause of liver cirrhosis.

Medical and Nutritional Survey. Medical, surgical and dental care alone, even with provision of adequate nutrition, is not the complete answer to the rehabilitation problem. Of great importance is the general program of rest, sleep, work and recreation with competent physical training. Environmental factors reaching back into early life may play a determining role.

AMERICAN RESTAURANT MAGAZINE

Vol. 27, June 1943

*Saves food for Army.—p. 10.

Save with salads for summer. V. Van Cleve.—p. 23.

Plan your conservation program. H. W. Espersen.—p. 42.

Army Reduces Food Waste. At Fredrick Army Air Field, Oklahoma, food waste has been reduced to less than 1% for the entire field. The old system of allotting a certain sum of money per man and allowing those in charge to make purchases has been abolished; food is now rationed for the field as a unit. Meals are prepared for the estimated number who will actually appear instead of preparing meals for the entire personnel. An extensive food education program through posters, lectures, classes and slogans, and an officer stationed at the garbage can, serve to remind soldiers that their eyes should be no bigger than their stomachs.

BAKER'S HELPER

Vol. 79, May 22, 1943

*Economical pastries in line with the times—new cookie ideas. J. A. Lambeth. —p. 56.

Vol. 79, June 5, 1943

*How Army bakers are trained by Quartermaster Corps.—p. 26.

War and post-war demands for cereal chemist's aid. M. A. Morris.—p. 28.

Modern decorating proves good advertising. M. McCulloch.—p. 32.

Duration Recipes. New, tasty, economical wartime recipes, using less shortening and more dates and prunes, can be made with a minimum amount of labor. Recipes include prune tarts with a thin, short crust and mallow cream topping.

Training of Army Bakers. U. S. Army bakers are drawn from all walks of life, about 40% having had previous civilian baking experience. Men who have worked in small bakeshops tend to make the best bakers since they have had experience in all phases of baking. First the theories and methods of bread manufacture are taught, then the students actually do each phase of the work learning to use first-rate equipment or improvised equipment made from anything at hand.

FOOD INDUSTRIES

Vol. 15, June 1943

*Value of brine peeling tested.—p. 51.

*Small dehydraters for vegetables.—p. 53.

*Using sugar to best advantage under rationing. J. Micka.—p. 69.

Closure for glass pack.—p. 76.

*Dehydrated soup bricks.—p. 76.

*Powdered orange juice.—p. 79.

*Pancakes from soybeans.—p. 79.

*Soybean products expand rapidly.—p. 94.

*Vegetable peeler.—p. 105.

Brine Peeling. By scalding root vegetables, such as potatoes and rutabagas, in a hot saturated salt solution (3.3 lb. salt/gal. water), the peel can then be removed in a suitable washer. USDA has prepared 2 brine peeler designs for use with gas or oil as fuel. Advantages in comparison with lye peeling are: salt costs about one-fifth as much as caustic soda, there is no personal hazard on handling, lye loses its strength quicker than salt, and any salt remaining on vegetables is not detrimental, whereas lye will cause discoloration or even ruin the product.

Home Dehydration. A small-scale dehydrater usable in the home has a 12-inch ventilating fan for circulation of air, 2 Nichrome coils as the heat source, baffles attached to the rear of the tray holders to give uniform air circulation through the trays, and a thermostat.

Sugar. Sucrose is necessary to control desired spread of cookie during baking, but certain types of flour and large quantities of shortening permit a reduction in sucrose. Su-

The Newer Concepts of Meat in Nutrition

"Give Us This Day..."

IN THE dim days of his past, when man first met his God and learned to formulate his prayers, his food—the products of the forests and the fields—provided for him all the nutritional essentials he needed.

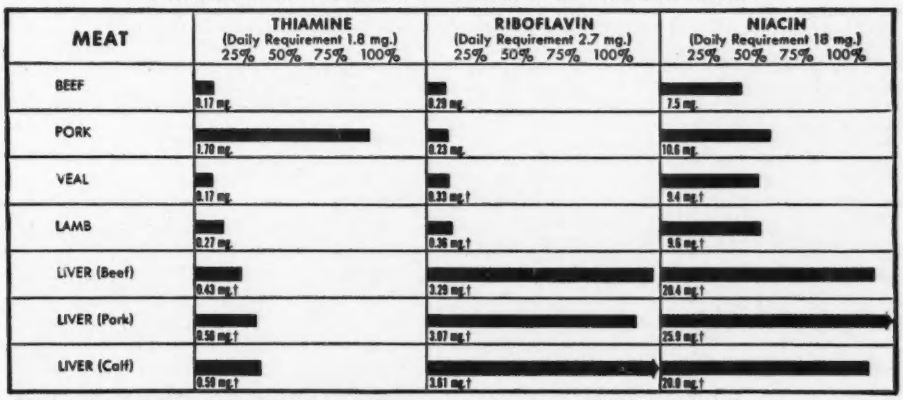
Today when food processing and cooking methods have departed a long way from man's primitive, primordial mode of living, an adequate daily supply of essential nutrients is not so easily obtained, particularly because of man's demand for constant change and variety in his diet.

Meat, one of man's preferred foods, helps bridge this difficulty. Its daily consumption makes an important contribution not only so far as protein requirements are concerned, but also for the satisfaction of water soluble vitamin needs.

As the appended chart shows, all meat is a good source of the B vitamins. Under certain methods of cooking, its vitamin values are largely retained. Under others, optimum benefit can be derived from the vitamin content of meat by utilization of the cooking liquids in flavoring gravies and sauces.

B Vitamins in Meat*

CONTRIBUTION OF 4 OZ. SERVINGS TO DAILY ADULT MALE REQUIREMENTS



*Unless otherwise stated, the values given are based on "Food as Sources of the Dietary Essentials" (A. M. A.) 1942
†Based on "The Vitamin Content of Meat" (Waisman and Elvehjem) 1941

The Seal of Acceptance denotes that the statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

American Meat Institute

CHICAGO

crose is necessary to prevent tough dough; if reduced, the temperature during mixing should be kept high to prevent toughness. When invert sugar is used, sucrose can be decreased proportionately, but invert sugar cannot be used alone. Soft, low-protein flours require less sucrose. Large amounts of cocoanut or cocoa powder require increased sugar.

Soup Bricks, "Supreme," a new dehydrated soup in bar form, no larger than a bar of candy, makes one quart of soup—onion, egg noodle, and vegetable flavored.

Powdered Orange Juice. California Food Research Institute has developed a dehydrated orange powder which when rehydrated has the full flavor, body, color and vitamin C content of fresh orange juice.

Pancakes. Soy Food Mills, Chicago, offers a griddle cake mix containing unbleached wheat flour, specially prepared soya product, dextrose, salt, and baking powder.

Soybean Products. Demand for soybean products, especially soybean flour, grits, and flakes, has increased. It is expected by the end of this year production will reach 1,500,000 lb. Most of these products have been used for military and Lend-Lease needs, but civilians are beginning to use them as meat extenders and in fortifying cereal products.

Vegetable Peeler. Robinson Brothers, Jersey City, is supplying vegetable peelers for dehydration plants in 3 sizes, 30, 50, or 75 lb. A cast-iron peeling hopper and revolving disk at the bottom of the hopper cause the vegetables to make continuous rolling contact with the abrasive surface.

ICE CREAM TRADE JOURNAL

Vol. 39, May 1943

Tips on wartime mixes. J. H. Erb.—p. 12.
*Motor maintenance. G. D. Bowne and W. W. McCullough.—p. 20.
Controlling variegated ice creams using sherbets, ices. B. I. Masurovsky.—p. 32.

Motor Maintenance. Motor maintenance in an ice cream plant calls for periodic and systematic inspection: once a week check oil level in bearings and see that oil rings are moving freely, check temperature of motor bearings and primary iron with the hand and sniff the warm air coming from open motors to be sure insulations are not overheated. Once a month check brush holders, brushes and shunts and blow out the motor with compressed air. Once a year check air gap with feeler gauge, check insulation resistance with Megger, check line voltage with voltmeter and load with a meter, clean out and replace greases in ball and roller bearings, and check renewal parts stock in light of past years' experiences. Every 2 years dismantle motor and see that all windings are tight, replace loose wedges and loose bands before dipping in varnish and baking, inspect commutators and commutator connections and remove bracket and wash out bearing housing with hot kerosene oil and compressed air if available.

NATION'S SCHOOLS

Vol. 31, June 1943

*Hot lunches for all. M. deG. Bryan.—p. 21.
Fats in school fare. L. Graves.—p. 48.

School Lunches. In this country we are failing to reach millions of school children; only one-third of our schools have school lunch programs. The FDA has a new plan to reimburse schools with a maximum of 7 cents per child for all fed a specific type of well-planned meal. An obstacle hindering school lunches is a ruling made by OPA grouping school cafeterias with commercial restaurants for rationing purposes. A number of colleges are offering special training in school lunch management for home economics teachers, and at least 2 states are planning an intensive 2 weeks' course for cook managers. In some schools meals are served morning and evening to defense workers and in the evening to parents. Some schools are planning to prepare one nourishing cooked dish which mothers could take home for the evening meal. The school lunchrooms have replaced the "community kitchens" of the last war.

Low Blood Sugars and High-Carbohydrate Foods

There is a disease that is associated with an increased supply of insulin to the body. It is represented by the development of minute tumors in the pancreas, tumors of the islands of Langerhans, producing excessive amounts of insulin, and that disease is a serious one because it is associated regularly with severe hypoglycemia. However, that disease is a relatively infrequent disease, and for every patient with that disease there are, I think, hundreds . . . who periodically have low blood sugars that are, you might say, functional in origin. There may be a nervous element to the production of some of these low blood sugars, but also that tendency to develop low blood sugars between meals is one that may be stimulated, I feel sure, by eating high-carbohydrate meals. It has been shown definitely that if one gives two doses of sugar, one following the other, the elevation of the blood sugar that is produced by the first dose is not observed in the second dose, and that the fall of the blood sugar after the dose of sugar is greater after the second dose. This hypoglycemia developing between meals is the reason that so many people, I think, are turning to soft drinks and so many industrial workers are finding that feeding sugar between meals helps to tide these people along and to keep them more effective. The objection to giving sugar between meals that way is that one doesn't provide with it the vitamins that are needed for its own utilization. One throws on the rest of the day's intake of food the burden of providing those vitamins and increases the likelihood of the individual's suffering from a chronic or a mild hypovitaminosis. In some cases I think severe grades of hypovitaminosis have been produced by excessive consumption of sugar. Certainly the more of this drinking of soft drinks between meals or eating of rich carbohydrate foods, such as candy bars, at those times of the day when one feels weak and empty, the more likely one is to need to continue to do so . . . eating sugar instead of correcting fatigue may lead ultimately to an increased sensitivity to fatigue.

We have found clinically at the Mayo Clinic, and others have made the same observation, that the best way to treat persons who have this tendency to low blood sugar between meals is to take them off a high-carbohydrate diet and put them on a high-protein, high-fat diet, with rather considerable restriction of carbohydrate and particularly with restriction of sugar. They may have starches because starches are a little slower to digest. These . . . enter the body less rapidly and they are associated with a less acute level of the blood sugar. They raise it less slowly than when sugar is taken as sugar and they raise it usually to a lower level, and the result is that the fall afterward is more gradual and to a less extremely low level. One of the reasons in my opinion why we are seeing more of the type of weakness in people occurring at 11 o'clock in the morning and at 4 o'clock in the afternoon and leading up to wanting something sweet to eat at those times is that the American people have gotten out of the habit of eating a good breakfast and a good lunch. The objections to eating . . . a little carbohydrate in the form of fruit juice and then some jam on a piece of toast and a cup of coffee with sugar in it and letting that represent the breakfast as a whole are two: In the first place you throw sugar into the empty stomach and into the blood rapidly and you get this effect that I have described. In the second place, whenever you skimp on one meal you have to depend on the other meals to provide you with the vitamins and the other nutrients that you require for a balanced diet, and as many people not only skimp on their breakfasts but also skimp on their lunches, it throws the whole burden of taking care of the nutrition on the one evening meal, and unless you choose that meal with greater wisdom than most people possess, you are among those who are in this borderline of nutritional deficiency.—*Wilder, R. M.: From a Symposium on Nutrition in Industry, J. A. M. A., 121: 869, 1943.*

No. 959 Roaster and Double Baker Oven

To save fuel and obtain best results, keep your Blodgett Ovens clean at all times and replace worn or broken parts promptly. We can ship repair parts without priorities. Write for our Comprehensive Service and Repair Manual.

RATIONED FOODS GO FARTHER WITH BLODGETT OVENS!

Confronted with limited quantities of various vital foods, dieticians are finding that oven-cooking offers these important advantages:

1. Food spoilage and shrinkage is decreased.
2. Left-overs are more palatable and varied.

For 95 years, Blodgett Roasting and Baking Ovens have been producing high quality foods—at low production cost.

THE G. S. BLODGETT CO. INC.

53 MAPLE STREET BURLINGTON, VT.

As previously announced, the total output of Sunfilled concentrated citrus fruit juices has been drafted for service of the armed forces. Not only have they provided a solution to the problems of perishability and cargo space required to transport bulky fresh fruits . . . they afford the equivalent in flavor, body, nutritive values and vitamin C content as well. This achievement of Sunfilled Products means a better balanced diet for our fighting forces and those of our allies receiving them as lease-lend supplies.

Sunfilled quality, economy and convenience count today! These dependable qualities will also serve to advantage in the planning of post-war menus. Until present restrictions are modified, available fresh fruits, though more costly and less convenient to prepare, should prove adequate for civilian needs.

CITRUS CONCENTRATES, INC.

DUNEDIN, FLORIDA

News Notes

Food Forum. The Dairymen's League Cooperative Association, Inc., New York, sponsored a Food Forum at the Hotel New Yorker June 15–16 for the purpose of promoting a "better understanding of what faces our nation in the matter of food . . . which will help in some degree to save it from a wholly disastrous food crisis." Speakers presented viewpoints of the farmers, processors, federal agencies, and the consumer, among them: Mayor Fiorello H. La Guardia; Col. Robert F. Carter, Q.C., U.S.A.; J. S. Russell, assistant to the War Food Administrator; Edith M. Barber, New York *Sun;* Paul S. Willis, president, Associated Grocery Manufacturers of America; J. A. McConnell, Cooperative Grange League Federation Exchange, Inc.; Jerry Voorhis, Congressman from the State of California; Dr. Edward S. Rogers, New York State Department of Health; W. I. Myers, economist, Cornell University; Dr. M. C. Bond, Cornell University; Quentin Reynolds, chairman, Food Committee, National Council of Farmer Cooperatives; Louis Bromfield; Dean Sarah G. Blanding, College of Home Economics, Cornell University; and Eloise Davison, New York *Herald Tribune*.

Miss Barber, representing the consumer, described the confusion which the housewife faces as a result of conflicting statements in the press and on the radio concerning, for example, probable food shortages and suggestions that she use substitutes for scarce foods, when she cannot find these substitutes on the market. Among her suggestions for improving the situation were adequate menus based on a plan showing the minimum amounts of foods which would be available (as established by the government), accompanied by modified standard recipes with suggested substitutions, a practical canning method suitable for use by city housewives, use of larger posters and better display of ceiling prices, and some provision for the marketing needs of women who work. Mayor La Guardia stated that in his opinion the greatest need at the moment was for the intelligent distribution of food so as to maintain the health of the American people. "I respectfully suggest," he added, "the volumes and reams and books of rules and regulations be discarded and that a set of regulations be written out, on one page, which the average retailer and grocer can read and understand." He suggested also a flexible coupon value for foods so as to make it possible to purchase substitute foods when any given staple commodity suddenly becomes scarce. Mr. Willis, representing the manufacturers and processors, in discussing recent efforts on the part of OPA to prevent inflation, said that, in his opinion, price control at the retail level was like trying to dam the Mississippi at New Orleans, and that ceilings must be flexible enough to encourage maximum production. He also proposed that only basic foods be under price control.

There was considerable discussion of substitute foods. Mr. McConnell explained that the reason red kidney beans, for example, would not be plentiful was that the reduction in price had discouraged farmers, in New York State at least, and that if higher prices were allowed so that it would pay the farmer to produce them, beans would still be a cheaper food than meat. Dr. Rogers was of the opinion that a certain amount of emphasis should be directed toward the use of substitute foods (such as soybean flour), even though not now available, in order to create interest when they are available. Louis Bromfield graphically described the difficulties of the farmer as a result of the lack of skilled farm labor because of the demands of the Army and industry; WPB restrictions on farm machinery, which according to Mr. Bromfield requires less than 3% of total steel output; shortage of adequate fertilizers; priorities and "red tape" concerned with distribution of farm machinery repair parts—all of which have resulted in the failure to plant or even plow many tillable acres. Congressman Voorhis cited the cooperative system in the State of California and elsewhere as a means of solving the food problem. Comments of other speakers appear elsewhere in this JOURNAL.

Though there were many conflicting opinions, there was general agreement on one point: that the first consideration is to make it possible for more food to be produced, and then to see that the food reaches the consumer in the quantities necessary and at a price he can afford to pay in the face of increased taxes. Some frankly stated that if this was not accomplished the present national food standard would soon be forced downward.

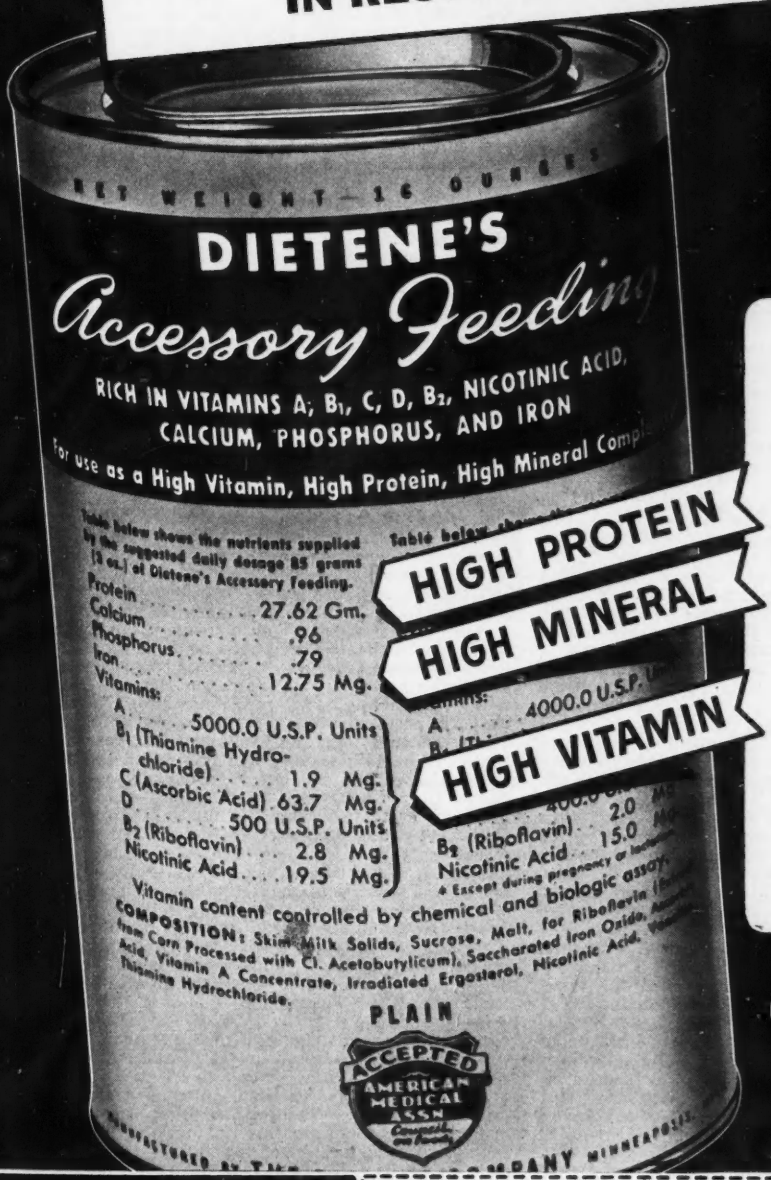
Medical Corps, Veterans Administration. A Bill (H.R. 2820, Representative Rogers, Massachusetts) to provide for a permanent medical corps in the Veterans Administration which would constitute a component part of the military forces of the United States has been introduced in Congress. Under the provisions of this bill with regard to nurses and other personnel, the superintendent of nurses would receive the rank of lieutenant colonel; 15 others, the rank of major; 125, captain; 400, first lieutenant; and 5000, second lieutenant. Such other commissioned and noncommissioned enlisted personnel and civilian employees as may be deemed necessary would be included. It is understood that the pay, benefits, etc. would be identical with that provided for personnel of corresponding rank and status in the United States Army.

Boston Dispensary Food Clinic Marks Its Twenty-Fifth Anniversary. The Boston Dispensary Food Clinic was organized in 1918 by Frances Stern who on July 4 celebrated her seventieth birthday. In recognition of these two occasions the employees and staff of the Dispensary entertained at a tea on July 2 at which letters of appreciation and congratulation were presented to Miss Stern from her friends.

Food Officials Pledge to Maintain Standards. According to the *Food Field Reporter* for June 7, the Association of Food and Drug Officials of the United States adopted resolutions opposed to the use of incubator reject eggs in the production of dried eggs for government purchase, and the rechristening of the product known as "dried skim milk" to "dry milk solids"; and endorsed a bill to strengthen control of the production of renovated butter and one providing for distinguishing between white poisonous insecticides and fungicides and certain foods and food products. On the subject of stretchers, adequate labeling was urged so that the consumer will know when such devices have been used to extend meats, butter, and oils, for instance.

Special Committee on U. S. Navy Food Administration. Secretary Knox has appointed a special committee made up of representatives of the hotel, restaurant, and food industries, to make a study of the Navy's food administration. Following visits to many stations and ships the findings of this committee, according to the National Restaurant Association *News Letter*, were to be presented to Secretary Knox on June 11. The July 6 *News Letter* included some of the highlights of the report to Secretary Knox, among which were the following: "Generally the quality of food supplies was excellent, and, of course, the nutritional content of meals was adequate; so were the quantities of food available. Considering the magnitude of the problem and the quick expansion of personnel, preparation was reasonably good, although the standards of palatability were not quite up to those of successful restaurants. Time and care will undoubtedly tend to solve the little problems that go to make up this deficiency. In the highly important matter of waste, it was the considered opinion of the experts of the committee that there is less waste per capita in the Navy jurisdictions than in the average home or public institution where food is prepared and served, whether for profit or otherwise. This is so because practically all the food prepared and served in the Navy is consumed. The slogan, 'Take all you want, but eat all you take,' is not only preached but practised. Another very interesting feature of the committee's report which has important implications is that instead of overabundance, many shortages in supply were observed. For example, such items as beef, poultry, potatoes, and butter were often 'short'—in fact, sometimes unprocurable. The committee made an interesting observation concerning 'waste' and said there should be much greater care in the use of this term. As all restaurant operators know, everything which goes into the garbage can is not 'waste' in the generally accepted understanding of the meaning of the word. For example, egg shells, fruit rinds, bones after use for soup, etc., potato peelings, coffee grounds, are 'garbage' rather than 'waste.' What the men take at the time of serving but do not eat, is 'waste'—so is edible food permitted to spoil in storage. The importance of these definitions and the distinction made between 'garbage' and 'waste' is of countrywide importance. To the committee, it seemed that the cafeteria system, widely but not exclusively in use by the Navy where each man

ADEQUACY ASSURED without BURDEN IN RESTRICTED DIETS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For use as a High Vitamin, High Protein, High Mineral Comp
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Phosphorus .79
Iron 12.75 Mg.
Vitamins:
A 5000.0 U.S.P. Units
B1 (Thiamine Hydrochloride) 1.9 Mg.
C (Ascorbic Acid) 63.7 Mg.
D 500 U.S.P. Units
B2 (Riboflavin) 2.8 Mg.
Nicotinic Acid 19.5 Mg.
Vitamin content controlled by chemical and biologic assays.
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● Nutritional adequacy in restricted diets may be assured by the addition of Dietene's Accessory Feeding. This high protein, high mineral and high vitamin complement provides, in easily assimilated form, essential nutriments without overtaxing the digestive apparatus. Its low fiber content (.2%) makes Dietene's Accessory Feeding particularly useful in conditions associated with irritability of the gastro-intestinal tract. Its low fat content (.18%) and high protein content (32.5%) make it particularly useful in the treatment of hepatic diseases. In many pathological states, where diet problems are present, Dietene's Accessory Feeding provides essential nutrients in a pleasant and palatable form. Available in either plain or chocolate flavors.

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takes what he wants and can come back for more, but is expected to consume what he takes, is probably the most efficient known method of preventing waste of prepared food. Wherever and whenever second helpings rather than overlarge first service of 'portions' can be adopted, undoubtedly waste will be reduced."

Nutrition Program Materials. A booklet of wartime recipes, contributed by citizens of Greenwich, Connecticut, and compiled by the Greenwich Tuberculosis Association, Inc., entitled "What's More We Like It!" has been received from Gladys Hills, nutritionist. The recipes, many of which take into consideration wartime shortages, are preceded by a daily food plan and table of substitutions. There is an introduction by Hendrik Willem Van Loon and comic sketches accompany each group of recipes. Among the meat substitute dishes are: English Monkey, Walnut Roast, Lima Bean Croquettes, Bean and Peanut Croquettes, Rice Muffin Fritters, and Egg, Tomato and Cheese Dorsett.

Nutrition News Letter No. 13, the first to appear over the signatures of M. L. Wilson and W. H. Sebrell, chief and assistant chief, respectively, Nutrition and Food Conservation Branch, FDA, describes the work of the 5 divisions under their control: Nutrition, Food Conservation, Nutrition in Industry, Consumer Services, and Community Programs. New materials described that were to have been ready in June include: a pamphlet, "How to Help Your Government Promote Nutrition," contributed by Best Foods, Inc., and "The National Nutrition Program and How Industry Can Cooperate With It," contributed by the Kellogg Company. A leaflet, "The National Wartime Nutrition Guide," to be printed for general distribution, was to have been ready in July. One-half page of the *News Letter* was devoted to an account of the establishment of the Volunteer Dietitian's Aide Corps.

The *Market Basket*, June 26, prepared by the BHNHE (Bureau of Human Nutrition and Home Economics), contains facts about fats, including a fat-saving recipe for biscuits, and describes a leaflet on "Fats in Wartime Meals" available upon request from the Office of Information, USDA.

"Rural Family Spending and Saving in Wartime" is USDA Miscellaneous Publication No. 520, published as part of the study conducted by BHNHE in cooperation with the U. S. Bureau of Labor Statistics. It covers 1941 and the first quarter of 1942 and "presents facts from a sample representing all American families and single consumers who are not members of institutional or quasi-institutional groups." The volume is designed to meet the need for detailed information for wartime planning, but the facts assembled have a general as well as immediate significance since they offer a basis for an understanding of the effect of economic changes upon the welfare of several population groups. Tables include money expenditures for family living, money value of food and of food per meal, food home-produced and canned by rural farm families, garden products stored, quick-frozen and dehydrated, kitchen equipment of rural farm families, etc., etc. BHNHE issued in May "Root Vegetables in Wartime Meals," adding to their series of wartime recipe leaflets.

A revised edition of "Foods for Health," released by the Indiana State Nutrition Council and prepared by Estelle Nesbitt, nutrition consultant, Indiana State Board of Health, 1098 W. Michigan St., Indianapolis, includes 6 nontechnical nutrition lessons to meet the needs of localities where there is no one eligible to teach the Red Cross nutrition course or where there is an insufficient number of Red Cross instructors.

National Food Situation. The *Marketing and Transportation Situation* (Bureau of Agricultural Economics) for April-May shows that total cost to consumers of fixed quantities of foods making up a typical "food basket" was smaller in relation to average consumer income during the first 5 months of 1943 than at any other time on record. Actual consumer expenditures for food have risen more rapidly than food prices, owing in part to an increase in the quantity purchased, but not so rapidly as income. Reason for this is that "supplies of foods are maintained at high levels while supplies of nonfood goods and services are being sharply curtailed."

The *National Food Situation* for May predicts that stocks of most rationed foods, together with prospective production, probably will be adequate to maintain present consumption level until the end of this year. The storage situation of unrationed commodities is less favorable with respect to the outlook for supplies later. The present level of livestock production cannot be maintained, at least not beyond 1943, unless extraordinarily good yields of feed grains are obtained. If crop prospects are not improved in the next few months, consumption of feed grains in 1943 may exceed production, and feed shortages will result in 1944 unless the rate of feeding is reduced or the output of some classes of livestock curtailed. Prospects for winter wheat declined in most areas, indicating that the crop will be below average and 27% less than in 1942. Indicated production of rye is lower than in 1942; that of oats in the southern states is larger. Combined production of soft deciduous fruits (apricots, cherries, peaches, plums, and prunes) is expected to be materially smaller in 1943. Peach production is expected to decline to a low level—in 10 southern states possibly half that of 1942. Production of citrus fruits is of record size. (A statement by Chester C. Davis, reported in the June 16 *Victory Bulletin*, indicated that crop prospects were lower than a month previous and a little less promising than at the same time in any of the last 3 years, because of planting delays caused by weather conditions.) Charts on the "Supply and Disposition of Major Food Items 1935–43" show that, on a per capita basis, the civilian supply of most commodities has not fallen below the prewar period (1935–39), with the exception of dairy products (civilian supplies of which started to decline early in 1943), canned fruits and juices, and dried and canned fruits. As before, this report carries a complete list of ceiling prices established during a given period (March 21-May 17 in this case).

The May *Demand and Price Outlook*, also prepared by BAE, states that consumer income rose 1.7 times as fast during the first quarter of 1943 as it did a year earlier. Personal taxes required in 1943 may be 2 or 3 times greater than for 1942. The amount left over for purchases of food, clothing, other goods and services, and for saving is at an annual rate 10 to 15% higher than for last year. Food supplied to domestic consumers probably will be around 6% less this year than last. Production of fats and oils from domestic materials in the 1942–43 crop year is now estimated at nearly 1 billion pounds under the estimate of last December but about 1 billion pounds above 1941–42 production. The estimate of vegetable oil production has been reduced because of loss of soybeans still unharvested at the beginning of last winter, feeding of large quantities to hogs and other livestock, and an unprecedented demand for peanuts for peanut butter, peanut candy, and salted nuts. Estimated production of animal fats also is down as a result of a smaller than anticipated hog and cattle slaughter in federally inspected establishments, a scarcity of meat scraps for rendering, and a considerably smaller yield of lard per hog than in 1941–42, despite weights of hogs marketed. Frosts and poor growing weather have delayed the season for vegetables. Total acreage of all crops for which production estimates have been made is running about 12% lower than last season. Intended acreage of snap beans for processing is 19% larger than planted acreage last year, tomatoes for processing 2.4% larger, sweet corn 5%, green peas 6%, beets for processing 6%, while Lima beans for processing are about the same. Plantings of cucumbers for pickles are expected to be 13% smaller and of spinach in California and Texas almost 25% smaller. Contract acreage of cabbage is double that of last year. Production of potatoes in 3 major producing states is estimated at almost 30% above last season. The sweet potato crop is expected to be much larger than in recent years.

May 17. Establishment of a War Meat Board to facilitate handling of the nation's meat supply was announced, composed of 9 members, representing WFA, the armed forces, Lend-Lease, OPA, and specialized branches of the meat industry. While the quarterly and yearly requirements for meat by the armed forces, civilians, and Lend-Lease will continue to be determined by allocation authorities in Washington, the War Meat Board in Chicago will implement week-by-week the general allocation and distribution of the national meat supply, taking into account the total quantity available each week.

June 1. WFA ordered manufacturers of both roller and spray-process skim milk powder to set aside 75% of June and July production for government purchase under FD Order 54. (Manufacturers of spray-process dried skim milk had been setting aside 90% of monthly production.) In allocating the supply, only the most essential military requirements will be met. Quantities for both civilian and Lend-Lease will be considerably smaller than needed.

June 7. Under Food Distribution Regulation 2, representatives of schools under contract for training military personnel will be provided with a certificate to be presented to vendors in obtaining set-aside or restricted foods.

June 11. Government agencies are to take steps to ensure adequate supply and prevent increases in prices of canned green peas, snap beans, sweet corn, tomatoes and other primary tomato products.

#7 This is part of a series on matters of professional, educational and public interest, primarily related to nutrition and the scientific approach to the food problem, and giving the background of the products of General Mills. These messages are being disseminated through a number of professional and specialized publications . . . in the hope of providing material useful for the readers.

Proving the pudding... *with the facts*

CAKES, CAKES, CAKES. "Man cannot live by bread alone." We must never forget that the grains of the field must be transmuted into forms that match modern habits of consumption. We must remember their nutritiousness is barren *until they are eaten at America's tables.*

THE "STAFF OF LIFE" is not only more sustaining today, it is far better "eating." Our Products Control experts have sharp eyes for such wheat inferiorities as could impair bread quality.

THE KITCHEN is the funnel through which America's foods must pass en route to America's palates. And the palate reserves the right to reject any food—*however nutritious*—that does not please it.

The "kitchen-ability" and "palatability" of processed foods accordingly merit a great deal of thought.

In Minneapolis, a corps of trained home economists—the General Mills Home Service staff — support our Products Control Department in their task of keeping our flour and cereal products on the straight and narrow course of "quality." This Betty Crocker staff functions as the judge and jury (yes, and "policeman" too) in relation to the serviceability and attractiveness of the products we make for the home.

Science plays its part in grain selection and blending. But it cannot leave the stage at that point. Its responsibility does not end till the processing is complete, till the final products are ready for the consumer.

This responsibility calls for testing, not only in the laboratory, but under conditions of home use. For—however meticulous the care in selecting and testing the grains—there is always an off chance that some secret may escape us, that some unsuspected variation in the grain may escape detection. In the case of flour, for example, mixing by home methods, baking in the kind of heat home ovens generate, must be the capstone of all our tests.

Food means "eating." This explains the elaborate testing of our Betty Crocker Home Service staff.

General Mills,
INC.
Minneapolis, Minn.

AMERICA'S PRINCIPAL GRAINS—wheat, oats and corn—come to the table in forms of high deliciousness and serviceability via these products. *All of them bear the acceptance of the Council on Foods of the American Medical Association.*

"Betty Crocker," "*Kitchen-tested*," Softasilk, Bisquick, Wheaties, Cheerioats and KIX are reg. trade marks of General Mills, Inc.

June 12. WFA terminated the national marketing quota and removed national acreage allotment for peanuts produced in 1943 (part of the Agricultural Adjustment Act of 1938) and took other steps to facilitate production, processing, and marketing of the 1943 crop.

June 14. All livestock slaughterers operating under federal inspection are required to set aside 45% of all steer and heifer beef which meets Army specifications, for government purchasing agencies. Office of Foreign Agricultural Relations, USDA, announced that exportable surplus of milled rice from Brazil will enable that country to contribute substantially to the United Nations' food supply.

June 16. Claude R. Wickard, in a talk over NBC, described his visit to the laboratories of BHNHE where more than 1650 individual tests had been made since October to find best recipes for using soybean products, among them, a vegetable chowder in which soybean grits made up 30% of the solids, a pea soup with 30% and a gingerbread containing 10% soya flour.

WFA's *Cold Storage Report* on perishable food commodities held in warehouses and meat packing plants June 1 indicated that stocks of butter, cheese, eggs (both in shell and frozen), frozen and cured meat trimmings and lard were increased during May. Apples, frozen fruits and vegetables, frozen poultry and frozen and cured beef, pork, and lamb and mutton stocks were reduced. The into-storage movement of butter was significantly heavy; cheese holdings were considerably heavier than average.

June 18. Under the revised white bread formula provisions of FD Order 1, effective July 1, bakers may use greater quantities of sugars or other fermentable carbohydrates or may increase the use of shortening in bread. All white bread is still to be enriched, but the requirement that a minimum of 3 parts milk solids or skim milk be used in each 100 parts flour in white pan bread formulas was removed, while the maximum of 4 parts was retained.

June 21. OWI stated that U. S. prisons have increased 1943 plantings of farm crops 25%. WPB has arranged for government purchase of surplus canned goods and other commodities to help fill Lend-Lease and military requirements.

June 28. FD Order 44 requiring packers to reserve 60% of 1943 pack of canned tuna, bonito and yellowtail, has been removed, increasing the quantity available to consumers to about 25,000,000 lb. Reservation of substantial percentages of salmon, sardines, mackerel and shrimp continues in effect.

June 21. OPA subsidy "roll-back" program for meat to reduce price to the consumer about 10%, or an average of 3 cents per pound, was announced by OPA in *Victory Bulletin*. Effective date for processed pork was to be July 1; for other meats, June 21.

June 29. Judge Marvin Jones was installed as War Food Administrator, succeeding Chester Davis.

Soybeans. Sprouted soybeans, a product old to China but new in this country, were offered in several different forms as part of a luncheon served at the Executive Mansion, Albany, New York, to 67 guests, including representatives of newspapers, magazines, and radio, and nutrition experts, according to the New York *Herald Tribune* for June 15. H. E. Babcock, chairman of the Emergency Food Commission of New York State, which sponsored the menu, explained that the beans were two ordinary field varieties grown in New York State for the feeding of livestock, and were purchased from an agricultural supply house for 3 cents a pound. According to the story: "Sprouted by a simple process of watering at the New York State College of Agriculture, the soybeans in 4 days had been transformed from pig feed inedible by humans into a fresh vegetable rich in vitamins and comparable in many ways to meat in its content of protein and minerals. Mr. Babcock said that the supply available was inexhaustible, that the processing was simple, and that if commercial interests would take the hint there was no reason why sprouted soybeans should not be delivered to the New York markets in carload lots."

The sprouted soybeans were served as part of a chicken soufflé, as part of a salad, and sautéd with onions. "Few of the guests failed to clean up their plates. . . . Impressario of the sprouted soybean is Dr. Clive M. McCay, of the State College of Agriculture."

Food Yeast. The following information about "food yeast," received from the British Information Service, is quoted from *Nature*, March 6, and supplements that in the abstract from the *British Medical Journal*, p. 452 this JOURNAL for June: "The product known as 'food yeast' which has resulted from the researches of the Chemical Research Laboratory could be successfully incorporated into biscuits and could, if added to flour, yield a most palatable loaf; 5% of it added to a 2-lb. loaf would increase its nutritive value as much as would the addition of ½ lb. beef-steak or 2 eggs. Food yeast can be produced from waste molasses. . . A continuous process has been developed: a solution of molasses and the necessary ammonia and phosphate enter one end of a vat, and an equivalent volume of yeast in suspension is withdrawn from the other. Thus a product containing a high concentration of B-vitamins and a high-grade protein is made in a matter of hours. It is estimated that ½ oz. taken daily would ensure a sufficiency of B-vitamins and that it can be supplied at 6*d*. per pound."

Dehydrating Cheese. A new method for dehydrating American Cheddar cheese for Lend-Lease or other uses, more direct than that now in use and which will release spray-drying equipment for other foods, has been announced by ARA, USDA. Natural Cheddar cheese in its original state usually contains about 36% water; the dehydrated flakes as prepared in the Bureau's laboratories contain about 3% and the product weighs only two-thirds as much as the original cheese.

Feeding in Industry. A brief summary of the report of a survey, made by the Women's Bureau of the Department of Labor, of food conditions in war industries is contained in *Victory Bulletin*, June 16. The survey pointed out that "the government has mapped balanced diets for industrial workers and the OPA's rationing branch is willing to make allowances for increased food allotments if labor or management will take the initiative and work out mass feeding facilities. . . . The Women's Bureau has formulated standards for eating periods for women in war plants—a minimum of 30 minutes' time, a menu that includes hot, nutritious foods at a reasonable price and a pleasant place in which to eat, away from the workroom. In a recent survey of 183 war plants, Bureau agents found that 123 gave 30 minutes for lunch, not paid for in the workers' wages. A total of one-fifth of the plants paid for lunch period ranging from 15 to 30 minutes." The primary reason for absenteeism due to anemia, indigestion, etc., is, according to the report, an inadequate supply of food at places of work. A program of education of the workers, cooperation of factory management and existing local firms and local community organizations, is suggested.

News From the National Restaurant Association. The June 7 *News Letter* quotes the Public Relations Committee of the American Hotel Association as stating that many hotels are conserving food by serving only one pat of butter and 1 teaspoon (or lump) of sugar, bacon as the only rationed meat at breakfast, no baked potatoes, which are eliminated to conserve butter, ice cream only every other day and without accompanying cakes, only one cup of coffee at breakfast and luncheon, and demi-tasse at dinner. Salad dressings are not served separately, steaks and chops no longer appear on à la carte menus and only for table de'hôte occasionally, and the number of ounces of steak per portion has been reduced.

With regard to fat conservation it is said that practically all foods should be deep-fat fried at temperatures running mainly from 250 to 385°F. or much below the maximum of 420°. It has been established that the maximum temperature needed for fried foods is 385° plus or minus 5°. In establishments which do not have temperature controls on frying kettles, it is suggested that a thermometer be used as a guide in frying. In the past the highest possible temperature was maintained in the fryer because the time element rather than conservation of fat or palatability of the product was considered most important. Fat heated for any appreciable length of time at abnormally high temperatures breaks down, decomposes, and the life of the fat is thereby reduced. Three additional essentials for fat conservation are: (1) Strain at least once daily to keep out carbonized particles. (2) Clean deep-fat fryer once daily. When cleaning with a detergent, thoroughly rinse fryer so that none of the detergent remains to break down the fat. (3) Melt new fat, when adding it to the deep-fat kettle, by bringing the temperature up to 250°F. If cold fat is added to hot there is a tendency for the fat to "crack."

The annual meeting of the association, according to the July 6 *News Letter*, will be held in Cleveland, October 19–21, at the Hotel Cleveland. The same issue carries an announcement by OPA to the effect that a program of "economy" meals to be served on railroad dining cars at dollars-and-cents maximum prices was started July 1. This means that standard types of breakfast would be 85 cents, luncheon $1.00 and dinner $1.10, based on prices during February 1–April 10, 1943.

Hotels and Red Cross Clubs. According to the *Hotel Monthly* for June, arrangements have been made through Mary Lindsley, director, Red Cross Hotel Management Course,

BUY WAR BONDS AND STAMPS

For jungle or ski troops—a new kind of cheese

Global war is hard on the food that keeps men fighting! One package may fry in a tank on hot desert sands—while the next freezes on a sled in Alaskan snows. But they should taste the *same*—and taste *good*—wherever eaten.

That has meant many headaches for the Army Quartermaster Corps and the food processors who supply them. But they've been cured, repeatedly, by American ingenuity. And National Dairy scientists have helped.

Cheese is a good example. For emergency use in arctic and tropics, National Dairy laboratories developed a dehydrated, compressed cheese bar that keeps well anywhere and takes less shipping weight and space.

When guns are hot and time is short, the emergency cheese ration can be eaten as is—like a candy bar. Or it can be mixed with a little water to make a tasty spread for bread. Or the mixture can be set aside for an hour or so and then sliced.

Best of all, this versatile cheese bar is rich in the nutrition of milk—nature's finest food—high in protein, and full of the energy fighting men need. And it's only *one* development of National Dairy research. We are working on others that we hope will play a part in ending the war and enriching the peace.

Dedicated to the wider use and better understanding of dairy products as human food . . . as a base for the development of new products and materials . . . as a source of health and enduring progress on the farms and in the towns and cities of America.

NATIONAL DAIRY
PRODUCTS CORPORATION
AND AFFILIATED COMPANIES

Originators of the Sealtest System of Laboratory Protection

whereby women about to be sent to foreign theaters of war to assist in managing the hotel-like Red Cross clubs, may visit a number of hotels in this country. They will observe the management of various departments as regular employees and "learn by doing." It is explained that the clubs which the Red Cross is establishing back of the firing lines provide American soldiers on leave with lodgings and restaurant and recreation facilities. In England alone more than 50 such hostelries are already operating and many are being maintained in other countries.

The Army Needs More Dietitians. The following communication was received from Major Helen C. Burns, Office of the Surgeon General, Washington, June 29: "The Officer Procurement Service will recruit dietitians for the Medical Department of the Army. This includes the three services: Army Air Corps, Army Ground Forces, and Army Service Forces. All who are interested in serving their country should contact the district office of the Officer Procurement Service located nearest to them." Following is a complete list of these offices: Suite 1407, 80 Federal Street, Boston; 248 Farmington Avenue, Hartford, Conn.; Room 400, 50 Broadway, New York; 90 State Street, Albany; 290 Main Street, Buffalo; 218 Harrison Street, Syracuse; 1144 Baltimore Trust Building, Baltimore; 2442 Fidelity Philadelphia Trust Building, Philadelphia; 1710 Clark Building, Pittsburgh; 612–13 Richmond Trust Building, Richmond; 740 Citizens and Southern National Bank Building, Atlanta; 910 Watts Building, Birmingham, Ala.; 1131 Third National Bank Building, Nashville; 505 Johnston Building, Charlotte, N. C.; 733 Huntington National Bank Building, Columbus, Ohio; 1407 Ingalls Building, Cincinnati; 740 Society for Savings Building, Cleveland; Post Office Building, Indianapolis; 432 Post Office Building, Louisville; Room 1100, 20 North Wacker Drive, Chicago; Room 1300, Penobscot Building, Detroit; 110 E. Wisconsin Avenue, Milwaukee; 16th and Douglas Street, Omaha; 708 Railway Exchange Building, 909–17th Street, Denver; Room 223, Porter Building, 406 W. 34th Street, Kansas City, Mo.; 1002 Builders Exchange, 629 Second Avenue So., Minneapolis; Room 649, U. S. Court House, St. Louis; 1013 Santa Fe Building, Dallas; 1001 Smith-Young Tower, San Antonio; 1640 Commerce Building, Houston; 1102 Hibernia Bank Building, New Orleans; 870 Market Street, San Francisco; 1418 Post Office Building, Los Angeles; 316 U. S. National Bank Building, Portland; 449 Federal Building, Salt Lake City; 904 Lloyd Building, Seattle; Room 2808, Munitions Building, Washington, D. C.

OPA Supplemental Allotments of Rationed Foods for Hospitals. In a communication dated July 5, OWI stated that OPA has "made a provision in the regulations (Section 11.6 of General Ration Order 5) which should enable hospitals to obtain the necessary supplemental allotments so that no patient shall suffer from dietary deficiency. This provision gives local War Price and Rationing Boards authority to grant such allotments to meet the dietary requirements of patients living in hospitals, whether or not such patients are on special diets. In determining the amount of the supplemental allotment of processed foods and the commodities covered by Ration Order 16, the local board will take into consideration the availability of fresh fruits and vegetables, unrationed substitutions such as poultry and fresh fish, and the physical facilities of hospitals to process and store such foods."

Another ruling of OPA, dated July 3, provided for inventory adjustments to be made in the case of institutional users having ration points tied up in dry and dehydrated fruits which on March 29 were removed from rationing and are not now rationed. Authority to make such adjustments is vested in the local boards and procedural instructions on the inventory adjustment have been sent by OPA to its field offices.

According to the *Journal* of the American Medical Association, July 3, Leighton M. Arrowsmith, administrator of St. John's Hospital in Brooklyn, has been appointed head of the hospital unit in the Institutional User Branch of the Food Rationing Division, OPA. Mr. Arrowsmith has been administrator of St. John's Hospital for 14 years and during that time has been president of the Hospital Council of Brooklyn, president of the Greater New York Hospital Association and for the past 3 years president of the Hospital Bureau of Standards and Supplies, and has also been active on the simplification and standardization committee of the American Hospital Association.

Protein Foods. The Nutrition in Industry Division has provided a chart, based on the NRC's list of protein content of some common foods, showing percentages of protein compared with the protein value (8 gm.) in 1½ oz. lean beef—the amount used in an average sandwich—as follows: 1 glass milk 87.5%, 1½ oz. chicken, e.p. 112.5%, 1½ oz. halibut 97.5%, 1½ oz. codfish 86.25%, 1 egg 75%, 1 oz. dried peas 80%, 3 oz. kidney beans 58.7%, ⅔ oz. Cheddar cheese 56.25%, 1 oz. cottage cheese 62.5%, ⅔ oz. Swiss cheese 70%.

Standards for Enriched Flours Amended. By these amendments, effective October 1, 1943, the standards of identity for enriched flour, enriched bromated flour, and enriched self-rising flour (originally published in the Federal *Register*, May 27, 1941), are modified. Each pound of enriched flour will contain at the minimum: thiamin, 2 mg.; riboflavin, 1.2 mg.; niacin, 16 mg.; and iron, 13 mg. In addition, calcium is made a required instead of an optional ingredient in enriched self-rising flour. In order that all white bread, whether baked in the home, in an institution, or in the commercial bakery, may contain these essential nutritive factors, this plan to enrich all white flours distributed for human consumption has been put into effect.

"Dietitians' Day" at the University of Alabama. Under the chairmanship of Dr. E. Neige Todhunter, 60 dietitians, lunchroom managers, and teachers met on June 16 for a refresher course. The program included: "Problems of Mass Feeding," Dr. Mary deGarmo Bryan; "Some Problems of Distribution," Mrs. Rowena Schmidt Carpenter; "Recent Advances in Nutrition," Dr. E. Neige Todhunter; and "Food Habits—Can They Be Changed?" Mable Adams.

Red Cross Dietitian's Aides. According to the Chicago *Tribune*, a group of 26 women, believed to be the first class of Red Cross dietitians' aides to be graduated from a hospital for Army veterans, received their diplomas July 7 at the Edward Hines Jr. Hospital. Kathryn A. McHenry, chief dietitian at the hospital, presented the diplomas. A report of her teaching methods and the type of responsibility assumed by the aides, will appear in this JOURNAL for September.

Recent Developments in New York State Nutrition Program. The Emergency Food Commission of New York has reported to the Governor an analysis of the present food situation in the state and suggested the following program: (1) Stimulate preservation of maximum amounts of fruits and vegetables by teaching proper methods of home food preservation. (2) Protect supply of fresh milk and eggs. (3) Carry on research for new foods. Progress has already been made in the last-named by the research staff of Cornell University School of Nutrition in its work toward improvement of selected staple foods and the development of new products to supply critical nutrients; among them, sprouted soybeans, a more nutritious bread, new spreads for bread.

Alabama School Lunchroom Managers. During the annual conference and short course held at the University of Alabama June 7–18, Dr. Mary deGarmo Bryan was lecturer and group leader of the daily workshop and Mrs. Mary E. Richardson, Paul Hayne School, Birmingham, directed the laboratory work.

War Time Institute, American Home Economics Association. Elsie Stark, Director of Consumer Relations, The Best Foods, Inc., reports that 175 home economists from all the states and territories of the United States and 50 other delegates representing allied national associations were present at the meeting held at the University of Maryland, College Park, June 17–22. Miss Stark served on two general committees and was elected to lead one of the discussion groups of the meeting, the theme of which was "Strengthening the Home for War and Postwar Living."

For This We Fight. As part of the series of discussions of postwar issues, sponsored by NBC's Inter-American University of the Air, "Food and Health in the Future" was presented July 17 and included among the speakers Dr. Frank Boudreau, chairman, Food and Nutrition Board.

Camp Fire Girls, Inc. The Camping Committee of the Detroit Council obtained many helpful suggestions for improving the mechanics of the kitchen and dining room from the home economics faculty and members of the institutional management classes of Wayne University, who were invited to camp for a week-end. The visitors took measurements and drew a floor plan for the operation of a camp kitchen with minimum equipment, and also offered suggestions for low-point or "pointless" meals for the summer camp season.

Dr. Joslin Awarded Distinguished Service Medal. Dr. Elliott Proctor Joslin, famous authority on diabetes and educator in that field, received the Distinguished Service Medal and Award of the American Medical Association for 1943.

Dr. Sawyer Receives Knudsen Medal. The 1943 W. S. Knudsen Award of the American Association of Industrial Physicians and Surgeons, according to the June 5 issue of the *Journal* of the American Medical Association, has been presented to Dr. William A. Sawyer, medical director of Eastman

how
Savory toast
gets that way

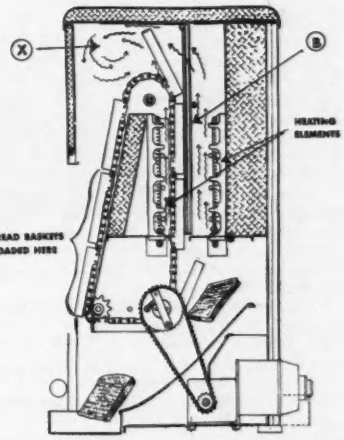
Non-technical, and really very interesting, we think . . .

question: "Why is Savory-made toast different and better than toast made in other ways?"

answer: "It's all because of the heat chamber at the top of each Savory Toaster. That PRE-COOKS the bread!"

question: "Is that good?"

answer: "Yes . . . you see the bread goes up the escalator to be thoroughly processed for toasting. Now see where 'X' marks the spot? That's it . . . the hot, moist dome-like pre-toasting oven where the moist heat currents caramelize the sugar content and transform insoluble starches to easily digestible dextrins. Then, coming down through the toasting chamber (B), both sides of the bread are quickly crisped to a delicious golden-brown by the double heating elements. *The center stays soft, fresh and tender.*"



question: "And that's an exclusive feature?"

answer: "Absolutely . . . no other toaster uses this process to assure a perfect *inside* to each piece of toast, as well as an appetizingly browned and tasty *outside* surface. So when you say 'Savory Toast' . . . you *really* mean it's Savory in every way!"

Savory has a complete line of electric and gas toasters. The dome-like, pre-heating oven which gives the toast its "soft-heartedness" and its crisp, crunchy browned surface is a feature of both electric and gas Savorys.

Write for FREE index cards giving new and unusual toast recipes for use in extending rationed foods.

You may now be eligible to purchase one of these efficient units under L-182. Consult your dealer or ask us for details.

Model CT-4, all-electric, 540 to 720 slices per hour.

Savory
EQUIPMENT

a division of TALON, INC.

128 PACIFIC STREET, NEWARK, NEW JERSEY

Model PQ . . . gas operated, 540 to 720 slices per hour.

Kodak Company, for "outstanding work in control of tuberculosis, constructive contributions to a practical program of nutrition in industry, and setting up a program of rehabilitation for handicapped workers in industry."

Margaret Brown on Red Cross Duty Overseas. Formerly on the staff of the Home Economics Department, University of Washington, Seattle, Miss Brown will go abroad as assistant club director for the Red Cross. She has worked in England for a number of years and returned to this country after the war began.

Philadelphia Dietetic Association. The following officers were elected for 1943–44: president, Marjorie Sims, instructor in home economics, Drexel Institute of Technology; vice-president, Evelyn Carpenter, Philadelphia Hospital for Contagious Diseases; secretary, Miriam Gaige, Jewish Hospital; treasurer, Betty J. Brewer, instructor in dietetics, Mount Sinai Hospital; member at large, Maxine M. McCown, Osteopathic Hospital; historian, Mae K. Fay, Agnes Irwin School; hospitality chairman, Margaret Madden, Philadelphia Psychiatric Hospital; membership chairman, Dixie Rudberg, University Hospital. Committee chairmen are: nominating, Henriette A. Pribnow, Jewish Hospital; program, Margaret Neubert, Friends Hospital; publicity, Joan Larivee, Horn and Hardart Baking Company; professional education, Grace Godfrey, dean of home economics, Drexel Institute of Technology; diet therapy, Sister Maude Behrman, Lankenau Hospital.

At the Professional Education Section meeting in March, with Dr. Helen Farrankop presiding, Dr. C. H. Smelzer, professor of psychology, Temple University, discussed evaluation records and the evaluation sheets prepared by the Professional Education Section, A. D. A.

At the May meeting, St. Christopher's Hospital, Dr. Walter L. Obold, professor of biological science, Drexel Institute of Technology, discussed "Bacteriology and Human Nutrition."

Martha Tarbox, Army dietitian, is now in North Africa. Second Lieut. Virginia Bounds, Fort DuPont, was a speaker on Home Economics Day, Drexel Institute of Technology. Aileen Holz, who completed a 6 months' course at Mount Sinai Hospital, is taking the Army apprenticeship training at Fort Leonard Wood, Missouri.

Sister Maude Behrman is in charge of reviews of current medical journals concerned with methods of treatment by diet, for the *Cyclopedia of Medicine* published by F. A. Davis Company.

Exhibits based on nutrition and food values in wartime, developed and approved by the Pennsylvania Dietetic Association, Philadelphia Dietetic Association, Pennsylvania Nutrition Council and the Division of Nutrition, Pennsylvania Department of Health, were shown at the War Conference of the Hospital Association of Pennsylvania, Philadelphia, April 15–16. The displays were divided into 3 units, 2 of which showed good and poor ways to spend ration points in the home, and portrayed and contrasted food rationing in the hospital and the home and illustrated striking facts on food waste. A third presented a series of small table displays emphasizing wise use of food by homemakers. Committee members in charge were: Anna dePlanter Bowes, Lillian Hack, Martha Hunscher, Eleanor Bigelow, and Miss Brewer.

An exhibit, "Nutrition and Diet Prescriptions in Wartime," for the Postgraduate Institute, Philadelphia County Medical Society, May 11–14, is described elsewhere in this JOURNAL. Dorothy Dean, Florence Fralin, Frances Feigert, and Miss Brewer prepared the exhibits and Helen Oseba, student dietitian at Mount Sinai Hospital, made the posters.

Lucille M. Refshauge has resigned her position as director of the Dietary Department, Mount Sinai Hospital, to take up graduate work at Teachers College, Columbia University.

Twin City Dietetic Association. The annual report of the president, Alberta Gurtler, states that there are now 50 paid memberships. Activities of the association during the past year included the following: appointment of an official delegate to the Institute on Education in a Changing World; distribution of material presented to the association by the Professional Education Section; and presentation of a poster promoting the work of the dietitian, to the A.D.A. Sufficient funds were authorized to provide additional copies to be made through the courtesy of the Art Department of the College of St. Catherine for distribution to schools throughout the state in the fall. Pamphlet material was also prepared for distribution by the state association. Further projects included the formulating of certain general policies, namely, that members be mailed copies of reports from the state president and national Association news; that persons eligible to membership be invited to not more than one meeting of the association, those ineligible to be invited occasionally; and that commercial concerns desiring to exhibit at an association meeting must have the approval of the special committee appointed to judge the value and authenticity of exhibits.

Utah Dietetic Association. The following officers were elected at the annual meeting on April 29: president, Emma Chapman, Veterans Hospital, Salt Lake City; president-elect, Evelyn Bushey Quinn, vice-president, Katherine S. Bielby, treasurer, Margaret Doidge Knudson, secretary and publicity chairman, Virginia K. Hagenson, all of Latter-Day Saints Hospital; program chairman, Ruth Clayton Kearnes, Fort Douglas; and section chairmen as follows: professional and community education, Margaret R. Rosenmeier, Veterans Hospital; administration, Mabel G. Johnsrud, St. Mark's Hospital, Salt Lake City; and nutrition, Susie Geiger, Holy Cross Hospital, Salt Lake City. Miss Bielby was appointed delegate to the annual meeting.

Virginia Dietetic Association. Recently commissioned lieutenants, Medical Department, A. U. S., are: Eleanor McKnight, Virginia Daley, Marjorie McKnight, Jean Collier, Faye Mitchell, Lottie Higgins, Virginia Turner, Roberta Jones, Lucy Warren Marsten, Sybil Rosenbloom, Beryl Obenchain, and Anna Laura Crance, all graduates of Madison College, Harrisonburg.

Seniors majoring in dietetics at Madison College have been acting as dietitian's aides at the Rockingham Memorial Hospital, Harrisonburg.

Mary Alice Grautham, formerly head dietitian, University of Virginia Hospital, Charlottesville, who resigned to be married, was succeeded by Julia Van Horn, graduate of Madison College. Hazel Blair, manager, Madison College Tea Room, has announced her marriage to Dr. Arthur Robert Anderson.

Recent graduates of Madison College have been placed for further training as follows: Amelia Artz, Cook County School of Nursing, Chicago; Corinne Baker, Walter Reed Hospital; Elizabeth Campbell, University of Maryland; Mildred Christian, Florida State Teachers College; Helen Crymes, Barnes Hospital; Eloise Hurd, Good Samaritan Hospital, Cincinnati; Hilda Jacobus, New Jersey Cooperative Hospitals, Newark; Emily Lewis, Johns Hopkins Hospital; Clara Louise Nissen, North Carolina Baptist Hospital, Winston Salem; Nancy Peters, Ohio State University; Hannah Ryland and Gordon Sampson, Medical College of Virginia; Margaret Shelton, Miami Valley Hospital; and Marjorie Snelling, Texas State College.

News From Our Advertisers and Exhibitors. Prepared by Meredith Moulton Redhead and Edith Eliott Swank of the *H. J. Heinz Company*, Pittsburgh, "A Guide to Wartime Cooking" offers a 9-point plan for wartime eating, which includes practical information and attractive recipes covering nutritional requirements in regard to milk, eggs, fish, meat and poultry, meat alternates, fats, vegetables, fruits, bread and cereals, and sweets. Suggested menus are listed for the daytime shift in industrial plants, the first night shift and the late night shift. Pointers on preparation, sandwich filling recipes, and constituents of an adequate box lunch are also included, as well as suggestions for left-over food, tips on food management, and recent data regarding the salvage program.

Marjorie H. Black of the Home Economics Division, *National Canners Association*, Washington, D. C., has prepared for distribution a booklet entitled "Quantity Recipes Using Canned Foods." The majority of the recipes were developed in the School of Home Economics, University of Washington, Seattle, under the direction of Effie I. Raitt, by Josephine Kincaid, a graduate student, under the immediate supervision of Margaret E. Terrell, Director of Dining and Residence Halls. Finished products were served in the University Commons, Residence Halls, Faculty Club, and Health Center. Although the work was done before the war, only recipes using canned foods available today and timely suggestions are included such as: combine chilled vegetable juice with tomato juice; use vegetable juice in gelatin salads; use oil and liquid from fish in cream sauce; and use fruit syrup in gelatin salads or sherbets. A "Canned Foods Contents Table," designed to aid the homemaker in shopping for rationed foods, is being released at suitable intervals.

Food for America at War

THANKS to America's teachers and home economists there is an ever-growing recognition of food values.

And this is particularly important now when America's diet must face the restrictions and fill the needs of war.

These are energy-consuming days. Hard work and action have replaced easygoing times. Even if it is only walking instead of driving, everyone is using up more energy.

And to keep well and feeling up to the job, that energy has to be replaced.

Everyone who knows, recognizes bread as a powerhouse of food energy. Its rich supply of carbohydrates and proteins makes it a great help when people lead active, hard-working lives.

Today bread merits more regard nutritionally than ever. For all white bread is enriched. It now contains an extra store of Vitamin B_1, niacin and iron.

Everyone likes bread. It is a pleasant supplement to all other foods. And presented with imaginative home economists' skill, it offers a never-ending array of attractive variations.

To America working to win, energy-building and good nutrition are vital. And appealing meals are a "must" for morale.

So with possible shortages in other foods, we believe you will agree it is wise to use more bread. It is tuned to the times in food energy, valuable in keeping meals interesting, and an important part of the diet of America at war.

MOST GOOD BREAD IS MADE WITH FLEISCHMANN'S YEAST
The yeast used by most of the commercial bakers of the country is Fleischmann's. Many bakers enrich their white bread by using Fleischmann's Enriched Hi-B1 Yeast, thereby insuring an even distribution into every slice of valuable quantities of Vitamin B1, niacin and iron.
FLEISCHMANN 1868-1943
75 years of good yeast for good bread

Bread is basic

In-Plant Feeding

On the industrial front it behooves us constantly to remember that malnutrition is no respecter of persons and is not limited to members of low-income families. We are turning out goods today in a strong "labor-market" characterized by severe management strain, so top management as well as the worker is vitally concerned with opportunities to attain optimal nutritional health. There are recognized authorities who believe that the only effective way to instigate a well-rounded program of improved nutritional health for the industrial worker is to begin the program with management itself so that it may be shown through improved personal health and vigor of the executives that advantages would accrue to the worker. The situation would then be ripe to demonstrate the increased production output that could be expected to follow the improved nutritional health of the worker. It should be pointed out here that whether the complete nutrition program is initiated with the worker or with management its success is dependent in the final analysis upon the employment of a qualified dietitian to whom adequate administrative responsibility has been delegated. With the increasing scarcity of available food supplies it will become more and more essential to have a nutrition department headed by a dietitian who possesses the requisite administrative capacity and ability to control costs and who knows nutritional food values and their effect when utilized by the body.

As manpower shortages grow acute and women more and more replace men in the essential war industries, management will have occasion to be grateful for the intensive college training and tested practical experience now required of the dietitian to meet the requirements of her profession. The problems of food supplies and distribution with possible increasing severity of rationing will make the dietitian's training and experience even more necessary to industry. A careful analysis of the management policy, the organization structure and the scope of duties delegated to the dietitian in the hospital suggests that a similar departmental organization pattern offers the greatest promise for industry. The dietitian should be made responsible for the entire service of food, including purchasing, planning, preparation, serving and cost accounting. She should also hire and fire her own employees in accordance with personnel policies existing in the individual plant and outline their duties and schedules of work. She should draw up a department budget for approval. The budget should be flexible enough to allow for a rise in food costs, the necessary price adjustments and the problems of procurement and availability that will result from rationing and scarcity of food products and of labor.

The nutrition education of the worker need not wait upon the availability of meals in the plant cafeteria that meet all the requisites of an adequate diet nor the establishment of a smoothly functioning and efficient nutrition department. Nutritionists from the department of health or from community organizations in each locality can be requested to initiate a nutrition education program in a plant. The nutrition course for women of the Bell Telephone System entitled "Food Makes a Difference" is one of the best. There are also nutrition programs that have been used successfully by commercial firms for their own employees that are now available for use by any firm desiring to contract for their materials. The monthly pamphlet services of some insurance companies offer a potential source of information for stimulating sound nutrition interest.—*Dodge, Q. O.: Food for Production. Industrial Medicine, May 1943.*

Managers who provide dietitians to supervise the in-plant feeding have found that their salaries are more than accounted for in savings resulting from better menu planning, wiser utilization of available food supplies, elimination of waste, and increased employee satisfaction with food facilities. A California contractor says he saved $24,000 the first 14 months after he placed a dietitian in charge of providing adequate food for his workers. He says, "Of all the money I've spent on projects for employee health and morale, the most practical investment has been the provision of adequate food."

At Remington Arms in New Haven the dietitian found that thousands of dollars' worth of food was going into the garbage pails each month. Through actual checkup, instructions on food conservation to cafeteria employees, and placement of responsibility for elimination of waste on the 7 cafeteria managers, the losses in food and money were reduced to a minimum.

When the Technical Advisory Service of the government's Nutrition in Industry Section received a request from the manager of the Avondate Mills in Sylacauga, Alabama, to advise him on how some type of factory feeding program could be initiated, it was found that a cold Victory Lunch service would be the most practical solution. Typical cold lunch menus that would be sufficient to meet the recommended dietary allowances as established by the National Research Council were suggested for the food service. These menus will be furnished other plant managers upon request. Many excellent menus for cold lunches have been set up by dietitians in various manufacturing plants. These are made available to employees so that they can have lunches of the proper kind prepared for their use.

Changing food conditions due to the fact that food is a weapon of war as well as a tool of production place added responsibility upon management in war plants. Food rationing is reducing the number of lunch boxes carried to factories by workers. Reports from crowded industrial areas show many restaurants no longer remain open to serve night workers, or to provide breakfasts. Through the provision of adequate meals in a 24-hour in-plant feeding service program, management can not only help employees maintain health, but can even improve health and efficiency. Every effort will be made by OPA to assure adequate food supply for industrial plant feeding.

Food demonstrations, programs providing tips on shopping under food rationing, on the planning, preparation and preservation of food are being conducted throughout the nation through the cooperation of nutrition committees. Wartime nutrition schools sponsored by newspapers with the cooperation of the management of war industries, public utilities and nutrition committees are successfully reaching thousands of war workers' families in some industrial areas. Information about these programs and other ways in which the government, industry, health departments, manufacturers' associations, chambers of commerce and nutrition committees are cooperating to meet problems affecting the nutritional health of workers can be secured from FDA's regional offices or the Nutrition in Industry Section, FDA, Washington.—*Sebrell, W. H.: Food Is a Tool of Production. Mill & Factory, May 1943.*